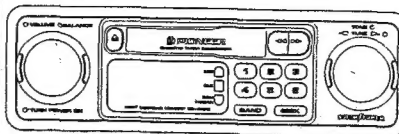


# Service Manual

**PIONEER**  
The Art of Entertainment

• KE-2828



ORDER NO.  
**CRT1331**

CASSETTE CAR STEREO WITH FM/AM ELECTRONIC TUNER

# KE-2033

UC, XSG/UC

# KE-2828

UC, ES, XSG/UC

• See the separate manual CX-197 (CRT1328) for the cassette mechanism description.

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## SAFETY INFORMATION (UC MODEL)

### CAUTION

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

### WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

## SPECIFICATIONS

### General

Power source .....	14.4 V DC (10.8 — 15.6 V allowable)
Grounding system .....	Negative type
Max. current consumption .....	2.5 A
Dimensions (chassis) .....	178(W) × 50(H) × 135(D) mm
(nose) .....	104(W) × 48(H) × 34(D) mm
Shaft interval .....	147 mm
Weight .....	1.3 kg

### Amplifier

Continuous power output is 3.2 W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.

Maximum power output

(KE-2828) ..... 8.5 W × 2 (EIAJ)

Continuous power output ..... 4.5 W × 2 (1% dist. at 1 kHz)

Load impedance

(KE-2828) ..... 4 Ω (2 — 8 Ω allowable)

Loudness contour ..... +8 dB (100 Hz), +4 dB (10 kHz)  
(volume: -30 dB)

### Tape player

Tape ..... Compact cassette tape (C-30 — C-90)

Tape speed ..... 4.76 cm/sec. (+ 0.14 cm/sec. — 0.05 cm/sec.)

Fast forward/rewind time ..... Approx. 100 sec. for C-60

Wow & flutter ..... 0.13% (WRMS)

### Frequency response

(KE-2828) ..... 50 — 14,000 Hz (±3 dB)

Stereo separation ..... 45 dB

### Signal-to-noise ratio

(KE-2828) ..... 52 dB (IEC-A network)

### FM tuner

Frequency range ..... 87.5 — 108 MHz

Usable sensitivity ..... 11 dBf (1.0 μV/75 Ω, mono, S/N: 30 dB)

50 dB quieting sensitivity ..... 16 dBf (1.7 μV/75 Ω, mono)

Signal-to-noise ratio ..... 70 dB (IEC-A network)

Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)

Frequency response ..... 30 — 15,000 Hz (±3 dB)

Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

### AM tuner

#### Frequency range

(9 kHz channel step) ..... 531 — 1,602 kHz

(10 kHz channel step) ..... 530 — 1,710 kHz

Usable sensitivity ..... 18 μV (25 dB) (S/N: 20 dB)

Selectivity ..... 50 dB (±9 kHz)

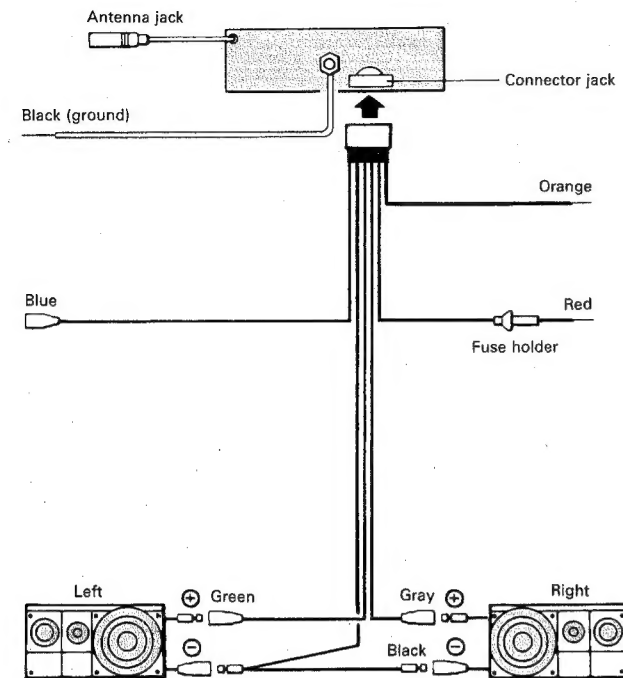
50 dB (±10 kHz)

### Note:

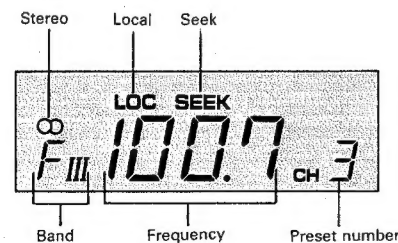
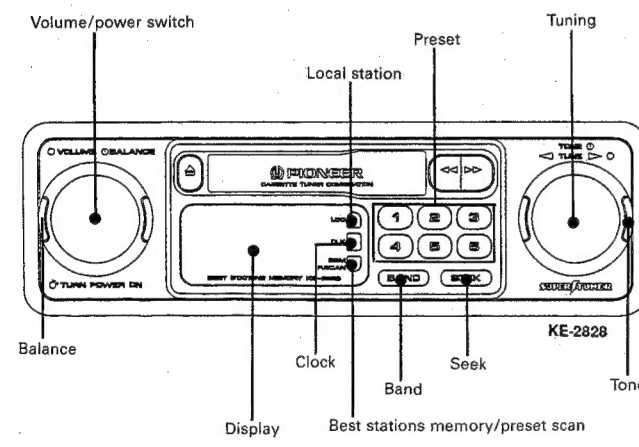
Specifications and the design are subject to possible modification without notice due to improvements.

## 1. CONNECTIONS

KE-2828



## 2. USING THE RADIO



### • Before attempting operation...

- Set the fader control to the center position. (A click can be felt when the knob is in the center position.)
- 1. Turning the power switch to the right causes power to switch ON and the current frequency to appear on the display.
- Since the set is designed preferentially for tape play, eject a cassette tape, if mounted, before operating the radio.
- 2. Press the band switch to select the band.
- 3. Press the seek button and the seek tuning indicator will be displayed.
- 4. Turn the tuning knob to the left or right to tune in the desired frequency. (Turning to the right will increase the frequency.)
- 5. Adjust the volume and balance.
- 6. Adjust the tone.

### • To enter a frequency into the preset memory...

- 7. Hold down one of the preset buttons (1-6) for approximately two seconds. The frequency is stored in memory (assigned to the preset button pressed) once the preset number stops flashing on the display.
- Six FM1 frequencies, six FM2 frequencies, six FM3 frequencies and six AM frequencies can be entered.

### • Auto-Loudness

When playing back a tape or listening to the radio at low volume, the low and high tones are automatically emphasized.

### • Clock Switch

Each press causes the display to switch between clock and frequency.

### • Best Stations Memory Button

Automatically tunes strong frequencies and assigns them to preset buttons 1 through 6 for one-touch automatic tuning. The best stations memory function is activated by pressing this button for approximately 2 seconds. The best stations memory function is indicated by — flashing on the display, and this function can be canceled by pressing the band switch. The frequency display returns once the best stations memory function is complete. The frequency displayed at this time is of the strongest station assigned to preset button 1 by the best stations memory function.

- 6 best (strongest) frequencies are memorized in the 6 preset buttons in the order of their strength, the strongest one being assigned to preset button 1.
- The frequencies previously assigned to the preset buttons are retained when 6 frequencies cannot be located.
- The best stations memory is in operation while — is flashing on the display.

### Seek Tuning

Press the seek button, and tuning to the next higher or lower broadcast on the band can be accomplished automatically by simply turning the tuning knob to the left or right. FM frequencies change in 0.2 MHz steps while those in the AM band change in 9 kHz steps.

- AM frequencies are tuned in 10 kHz steps after the tuning steps are changed.

### Preset Scan Tuning

Pressing the preset scan button (CH indicator flashes) causes previously stored frequencies to be tuned in sequentially for eight seconds each. Press again when the desired frequency is tuned in to cancel preset scan tuning.

### Preset Tuning

Pressing the preset button instantly tunes in the frequency programmed in the memory for that button.

### • Local Station Switch

Pressing this switch increases the seek threshold level so that only relatively strong stations can be tuned in (local indicator will illuminate on the display). Local seek threshold level can be selected among four levels for FM and two levels for AM.

Holding this switch down for approximately 2 seconds and then turning the tuning knob to the right changes the display from L-1, L-2, L-3 to L-4. Turning the tuning knob to the left changes the display from L-4, L-3, L-2 to L-1. (L-1 and L-2 for AM.) The bigger the number, the higher the seek threshold becomes and only relatively strong stations can be tuned in.

### Manual Tuning

When manual tuning is employed, FM frequencies change in 0.2 MHz steps while AM frequencies change in 9 kHz steps.

- AM frequencies are tuned in 10 kHz steps after the tuning steps are changed.
- 1. Press the seek button and the seek tuning indicator will disappear from the display.
- 2. Change the frequency by turning the tuning knob to the left or right. Turning the knob once will change the frequency one step (see above). Holding the tuning knob in either direction will successively change the frequency at the prescribed step.

## 3. BLOCK DIAGRAM

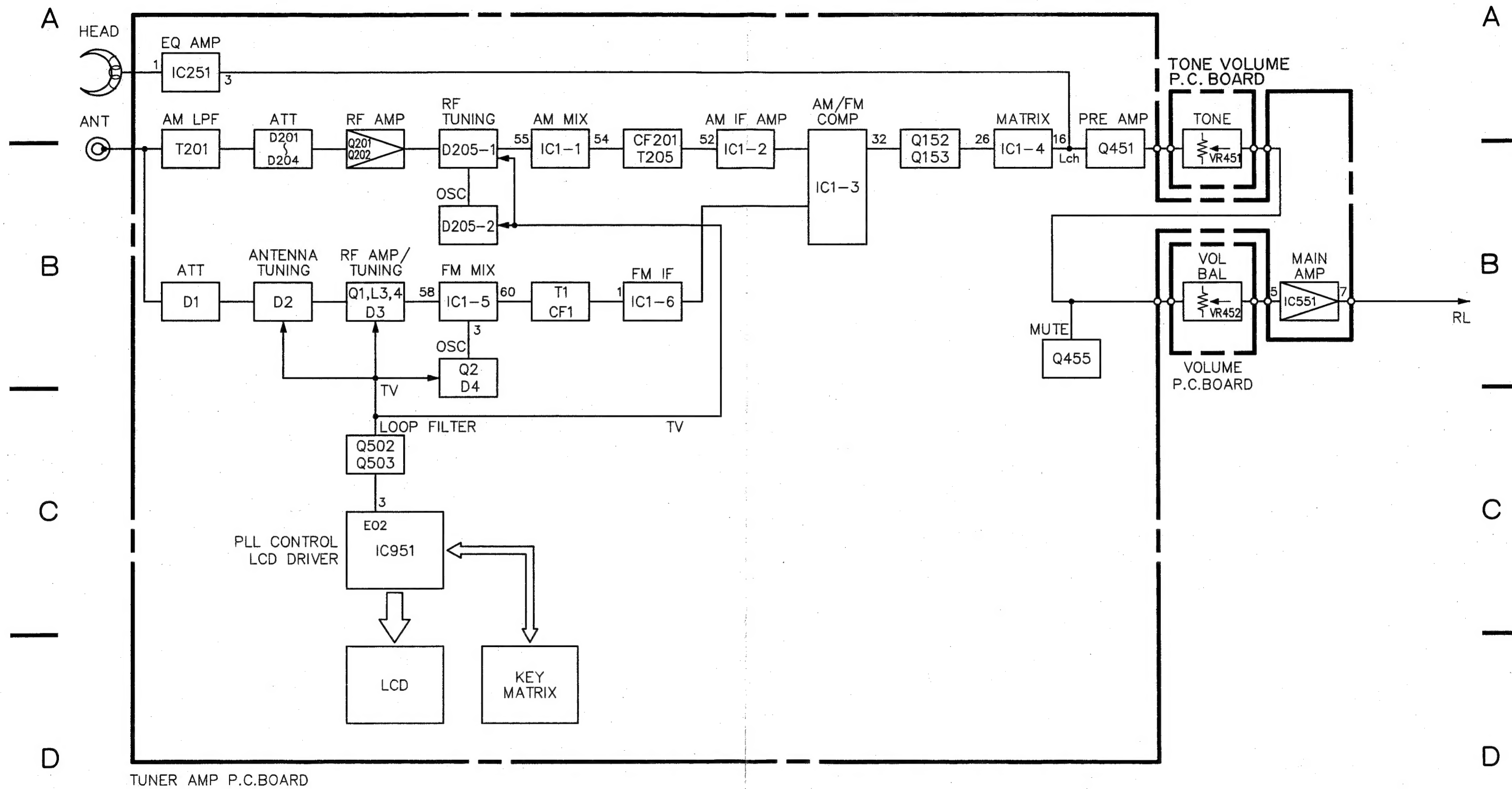


Fig. 1

## 4. DISASSEMBLY

### ● Removing the Case

1. Remove the two screws.
2. Insert and turn a screwdriver at locations indicated by arrows A to remove the case.
3. Raise the case to remove.

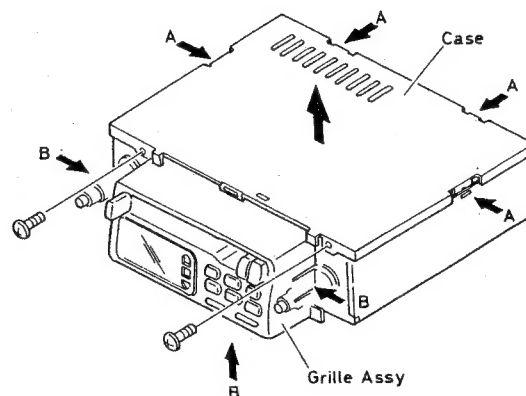


Fig. 2

### ● Removing the Grille Assy

1. Press the tabs at locations indicated by arrows B, and then pull grille assy.

### ● Removing the Cassette Mechanism Assy Section

1. Remove the four screws.
2. Disconnect the connector.
3. Remove the cassette mechanism assy section.

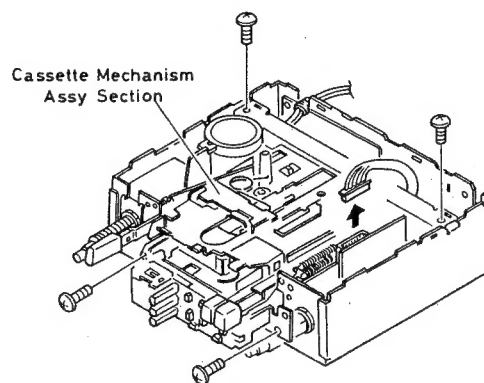


Fig. 3

### ● Removing the Tuner Amp P.C.Board

1. Remove the five screws and two nuts.
2. Unbend the tab indicated by arrow until straight.
3. Raise up on tuner amp P.C.board to remove it from the chassis.

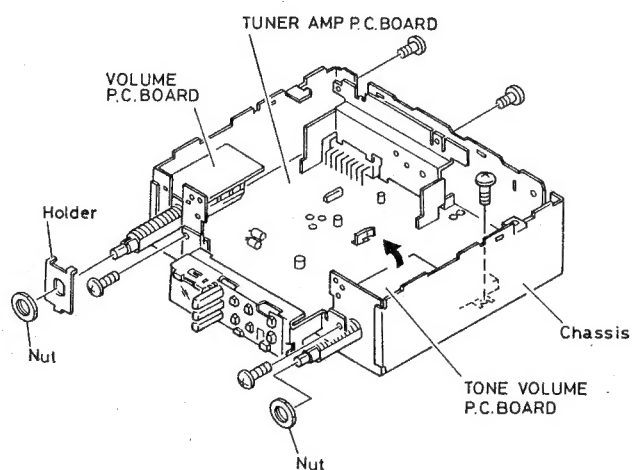


Fig. 4

## 5. ADJUSTMENT

### NOTICE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

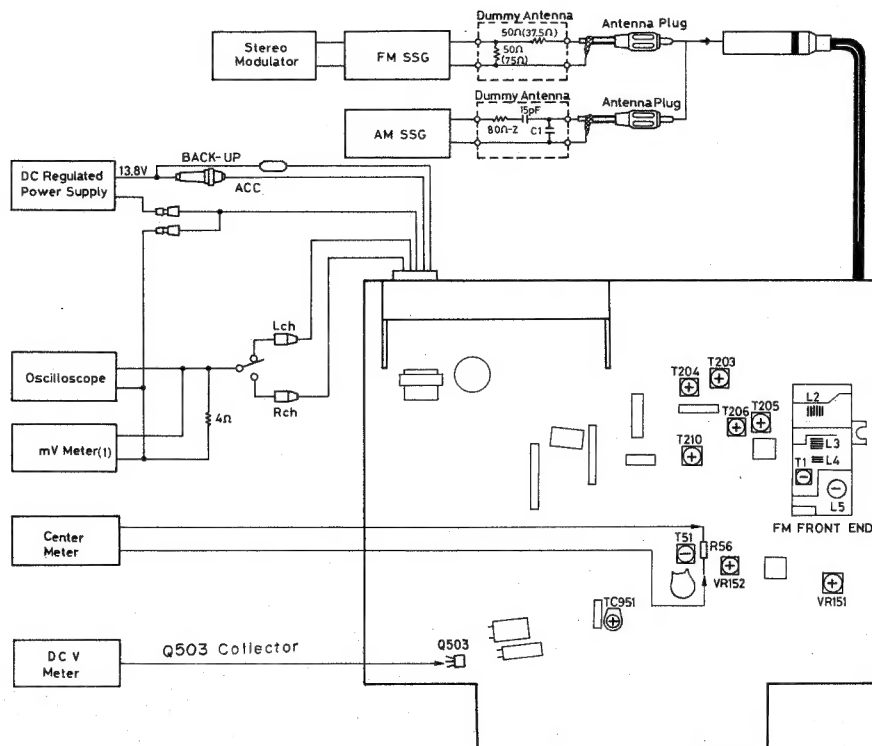


Fig. 5

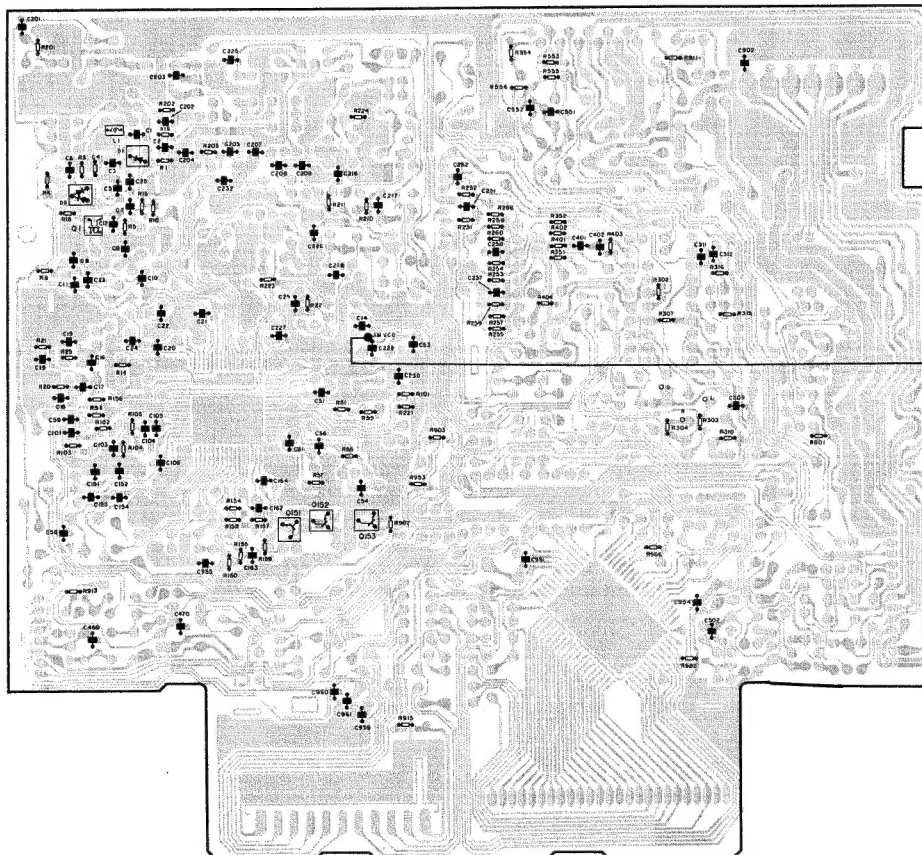


Fig. 6

## FM ADJUSTMENT

※ 1 Stereo MOD. : Pilot=10%

※ 2 Stereo MOD. : 1kHz, L+R=90% , Pilot=10%

	No.	FM SSG (400Hz, 100%)		Displayed Frequency (MHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (MHz)	Level (dBf)			
Tuning Volt	1	—	—	107.9 (US, UC) 108.0 (ES)	L5	DC V Meter: 7.0V
Tracking	1	98.1	15	98.1	L2, L4	mV Meter (1): Maximum
	2	98.1	15	98.1	T1	mV Meter (1): Maximum
IF	1	98.1 Unmodulated	65	98.1	T51	Center Meter: 0
Pilot Cancel	1	98.1※ 1	65	98.1	VR151	mV Meter (1): Minimum (MPX Filter: OFF)
ARC	1	98.1※ 2	40	98.1	VR152	mV Meter (1): Separation 5dB

## AM ADJUSTMENT

※ 3 : ES model when tuning step at 9kHz.

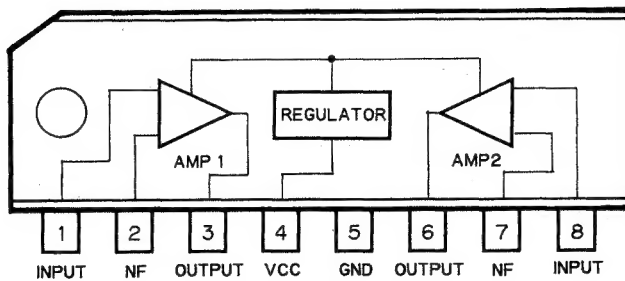
	No.	AM SSG (400Hz, 30% )		Displayed Frequency (kHz)	Adjusting Point	Adjustment Method (Switch Position)
		Frequency (kHz)	Level (dB $\mu$ V)			
Tuning Volt	1	—	—	530 (531)※ 3	T210	DC V Meter: 1.0V
Tracking	1	1,000 (999)※ 3	20	1,000 (999)※ 3	T203, 204, 205, 206	mV Meter (1): Maximum

## CLOCK ADJUSTMENT

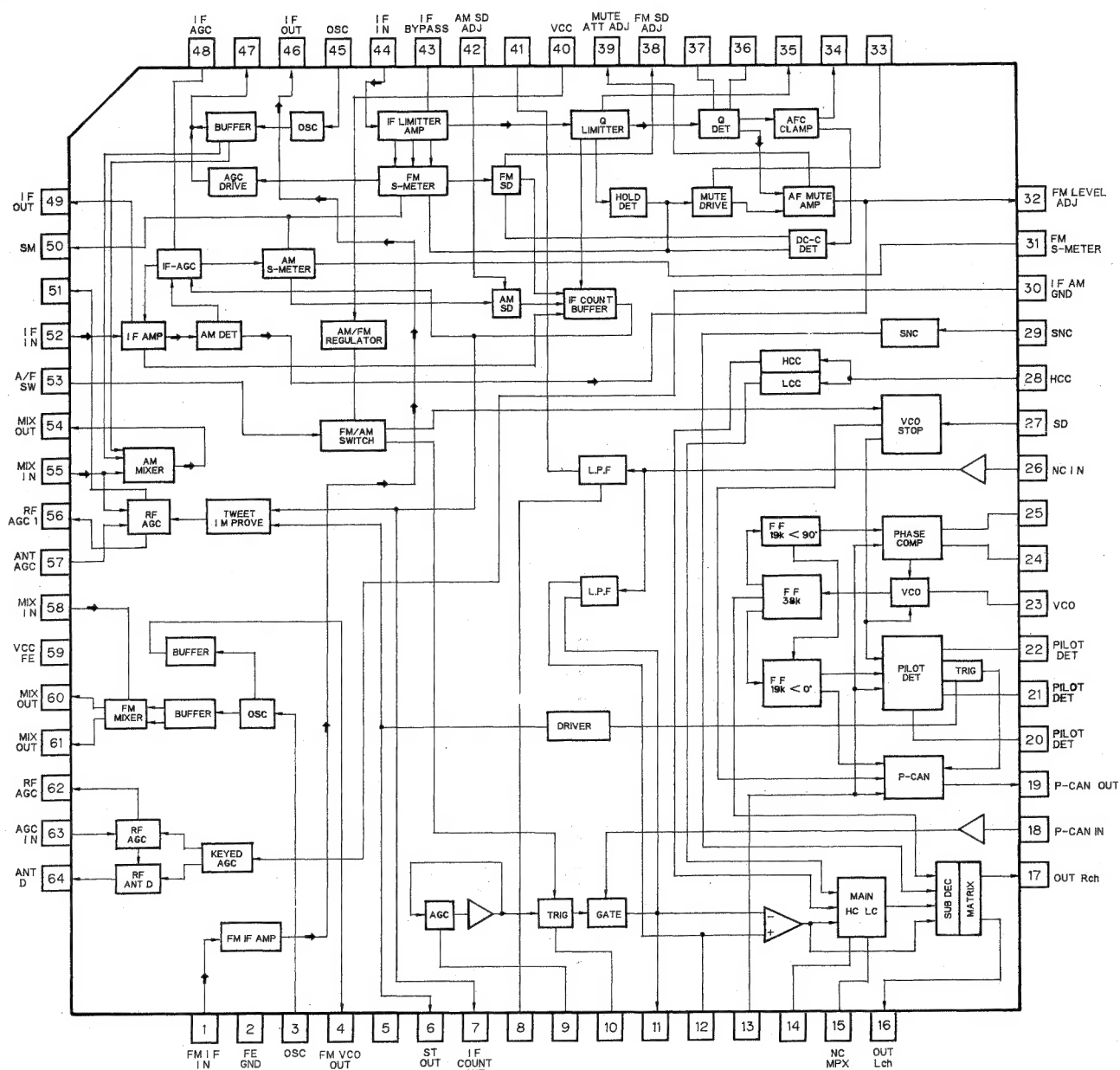
	No.	Band	Displayed Frequency (kHz)	Adjusting Point	Adjustment Method
	1	AM	1,710 (US, UC)	TC951	Frequency Counter: 2160kHz $\pm$ 40Hz
			1,602 (ES)	TC951	Frequency Counter: 2052kHz $\pm$ 40Hz

• ICs

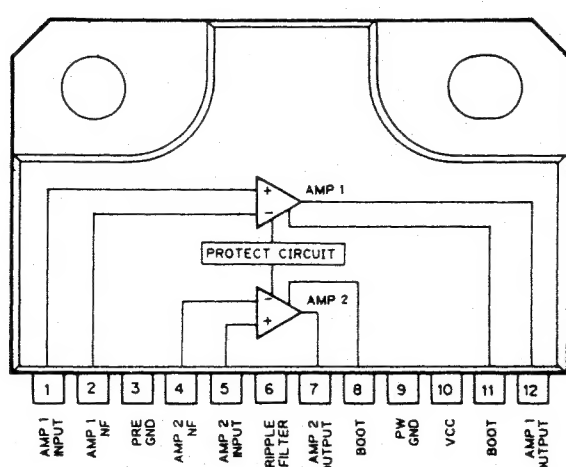
LA3161P



PAC001A







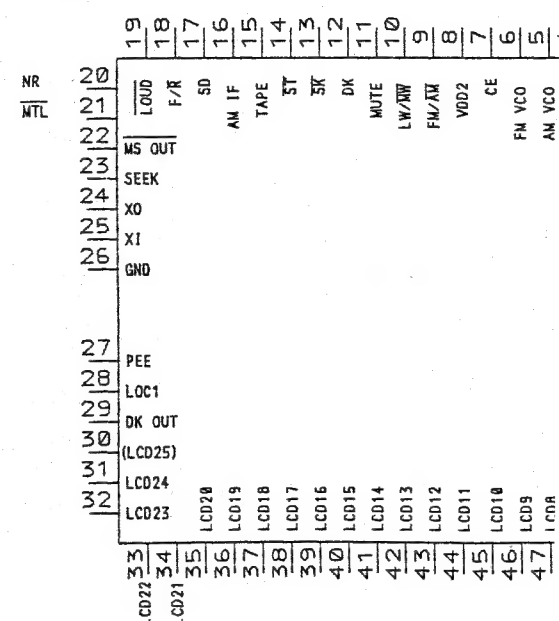
#### • Pin function (PD4275)

Pin No.	Pin Name	I/O	Output Format	Function and Operation
1	NC		C	Not used
2	EO1	Output	C(3)	PLL error output pins
3	EO2			
4	VDD1			Device power supply pin
8	VDD2			
5	AMVCO	Input		AM local oscillator signal input pin
6	FMVCO	Input		FM local oscillator signal input pin
7	CE	Input		Chip enable input pin
9	FM/AM	Output	C	FM/AM band select pin "H":FM "L":AM
10	LW/MW	Output	C	Loop filter switching output pin "H":LW
11	MUTE	Output	C	Mute output pin "H":ON
12	DK	INPUT		SK signal input pin
13	SK	INPUT		DK signal input pin
14	ST	Input		Stereo broadcast detection signal input pin "L":Stereo indicator is displayed
15	TAPE	INPUT		Tape power ON/OFF input pin "H":ON
16	AMIF	Input		AM IF signal input pin
17	SD	Input		FM SD input "H":During broadcast reception
18	F/R	Input		Tape motion signal input pin "H":Forward
19	LOUD	Input		Loudness ON/OFF signal input pin "L":ON
20	NR	Output	C	Dolby NR ON/OFF output pin "H":ON
21	MTL	Output	C	Tape METAL ON/OFF output pin "L":ON
22	MSOUT	Output	C	Tape MS ON/OFF output pin "L":ON
23	SEEK	Output	C	"H" level:SEEK, BSM, BSA and PSCAN
24	XO	Output	C	Quartz oscillator terminal
25	XI	Input		
26	GND			GND terminal
27	PEE	Output	C	Alarm output pin
28	LOC1	Output	C	Halt sensitivity switching pin
29	DKOUT	Output	C	Control by DK(terminal #12) input signal "H":DK input signal is detected as 125Hz
30	NC			Not used

Pin No.	Pin Name	I/O	Output Format	Function and Operation
31	LCD24	Output	C	Segment signal output
55	LCD0			
48	KS7	Output	C	Key matrix strobe
55	KS0			
56	COM1	Output	C	Common signal output
57	COM2			
59	K3	Input		Key matrix return
62	K0			
63	SL	Input		AM station level
64	NC		C	Not used

Output format	Meaning
C	C-MOS
C(3)	C-MOS(3 State)

\*PD4275



# Function and Operation

signal output pins to LCD

ix strobe output pins

signal output pins to LCD

```

ix return input pins

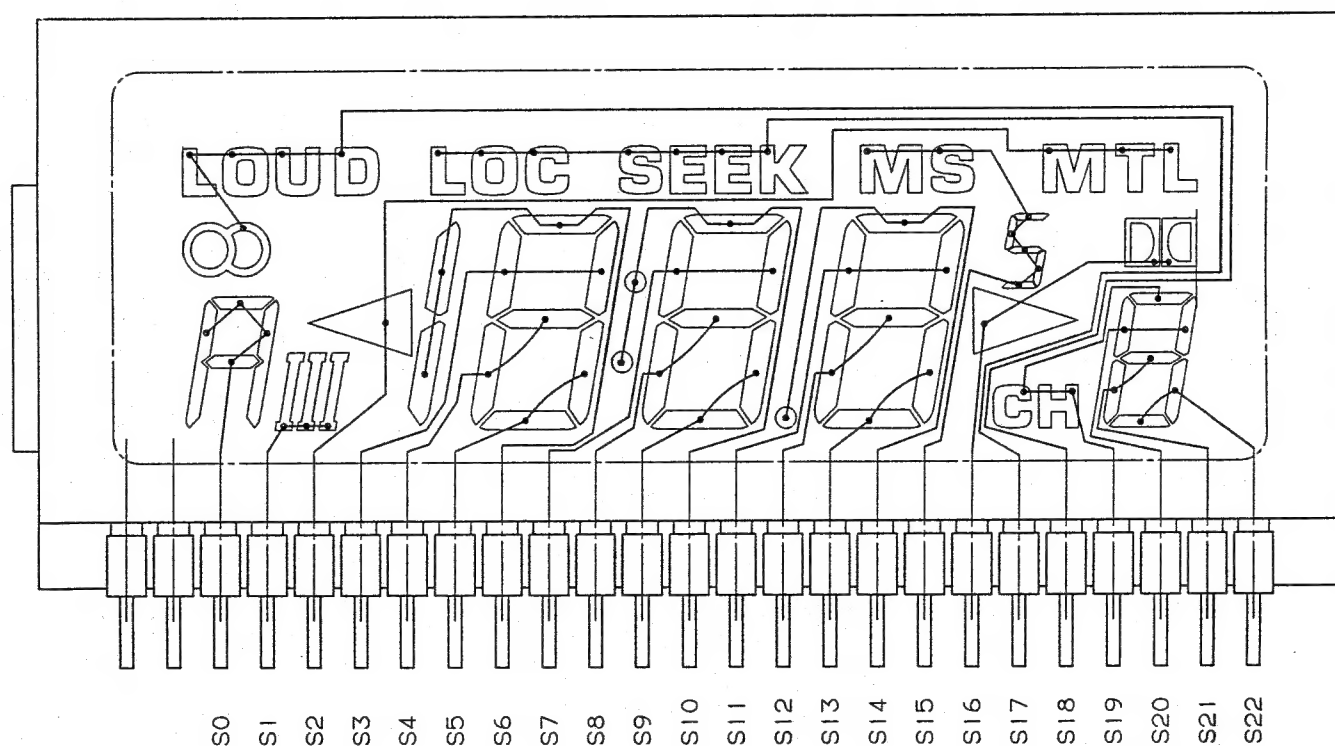
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ion level analog input pin

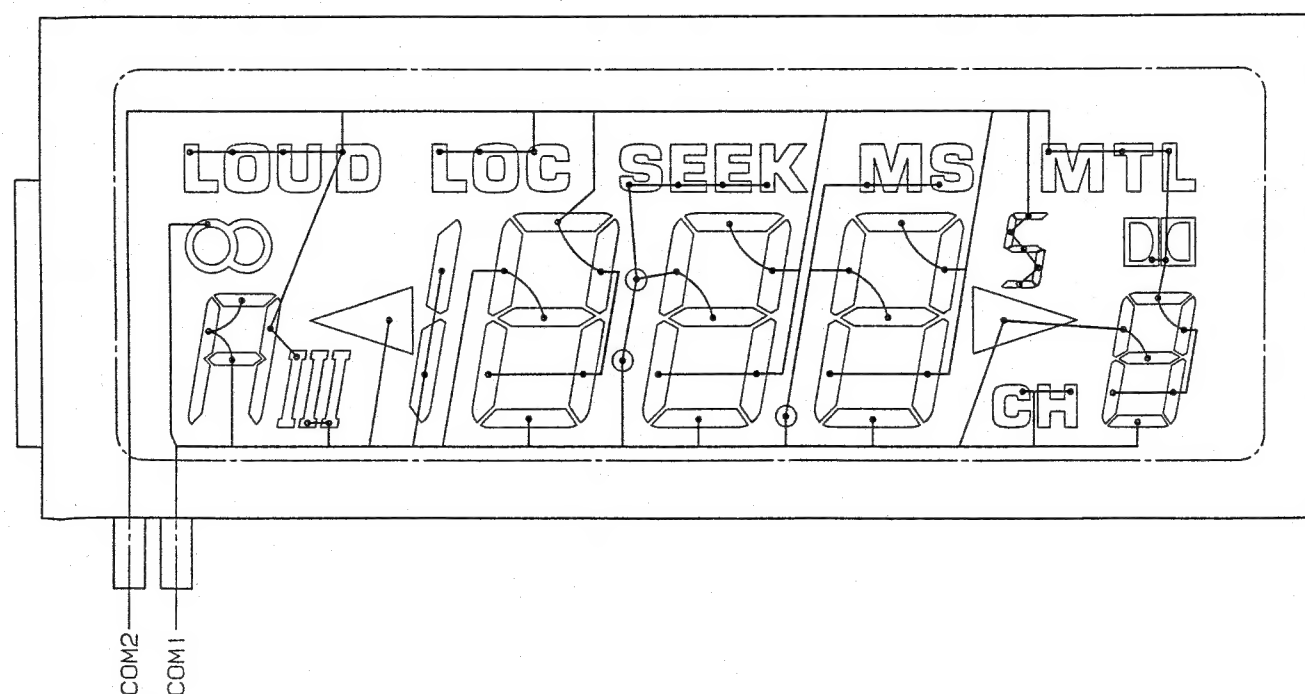
IC's marked by \* are MOS type.  
Be careful in handling them because they are very  
liable to be damaged by electrostatic induction.

[illegible]

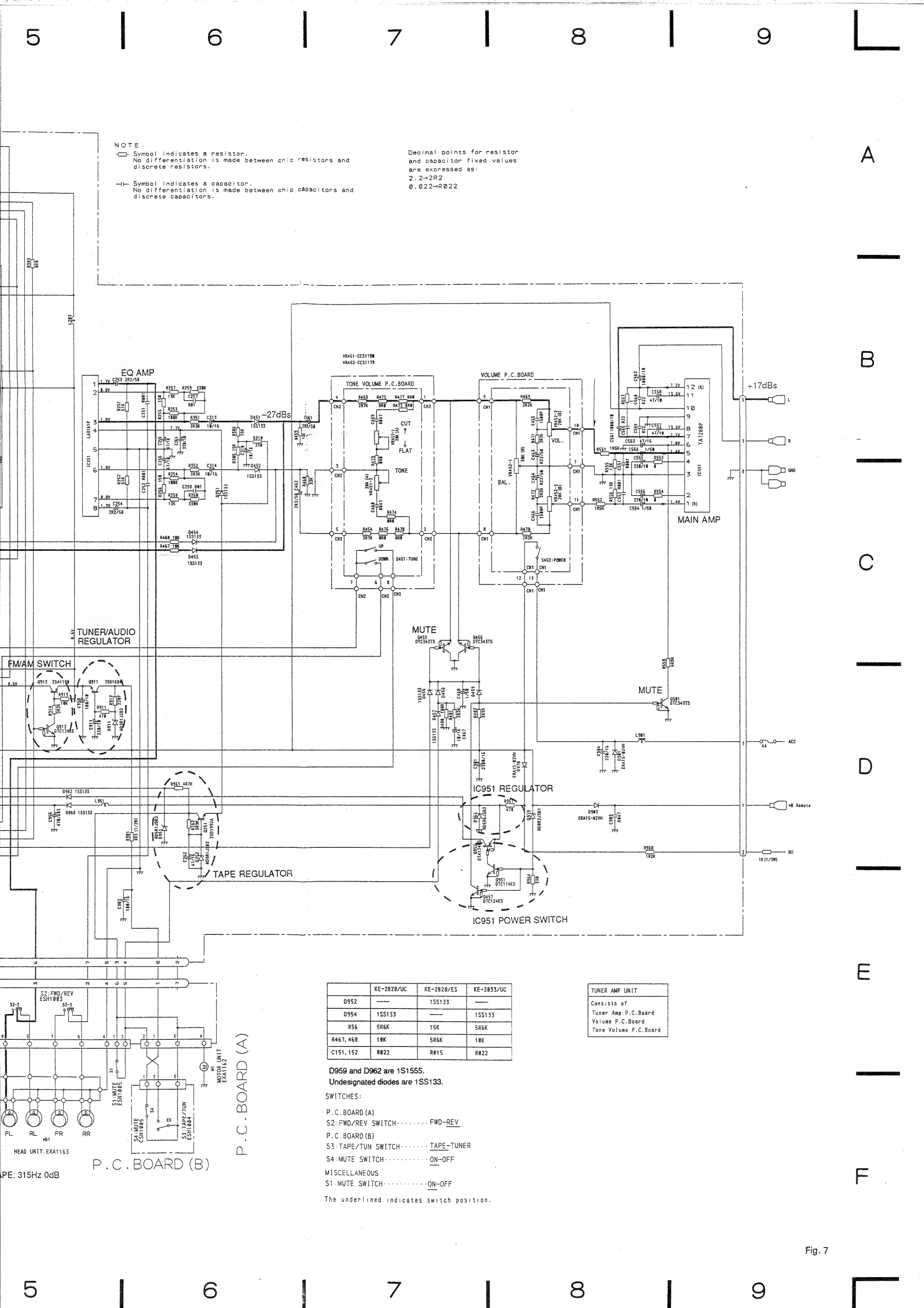
• LCD (CAW1116)  
SEGMENT



**COMMON**

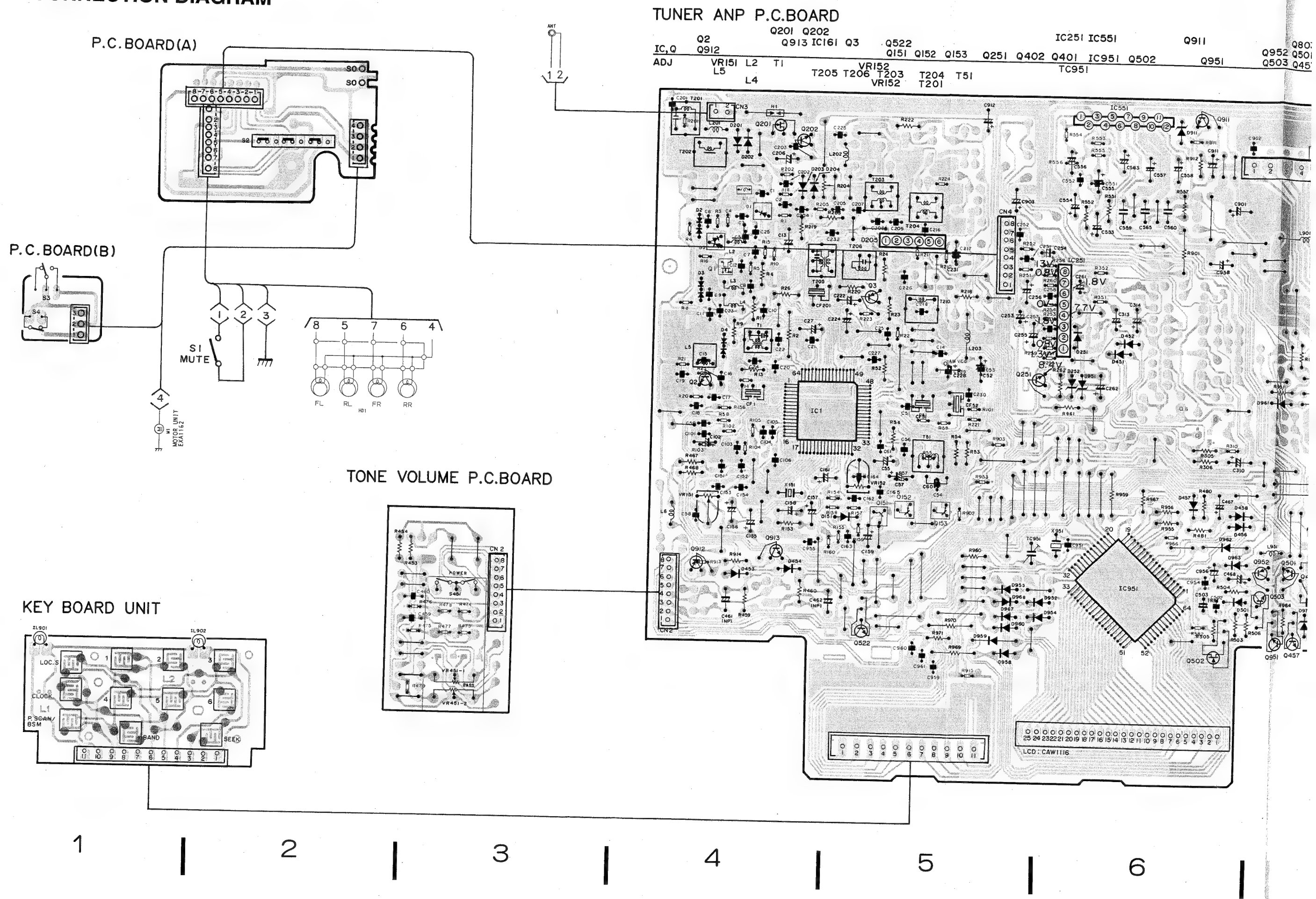








7 CONNECTION DIAGRAM





## D



22



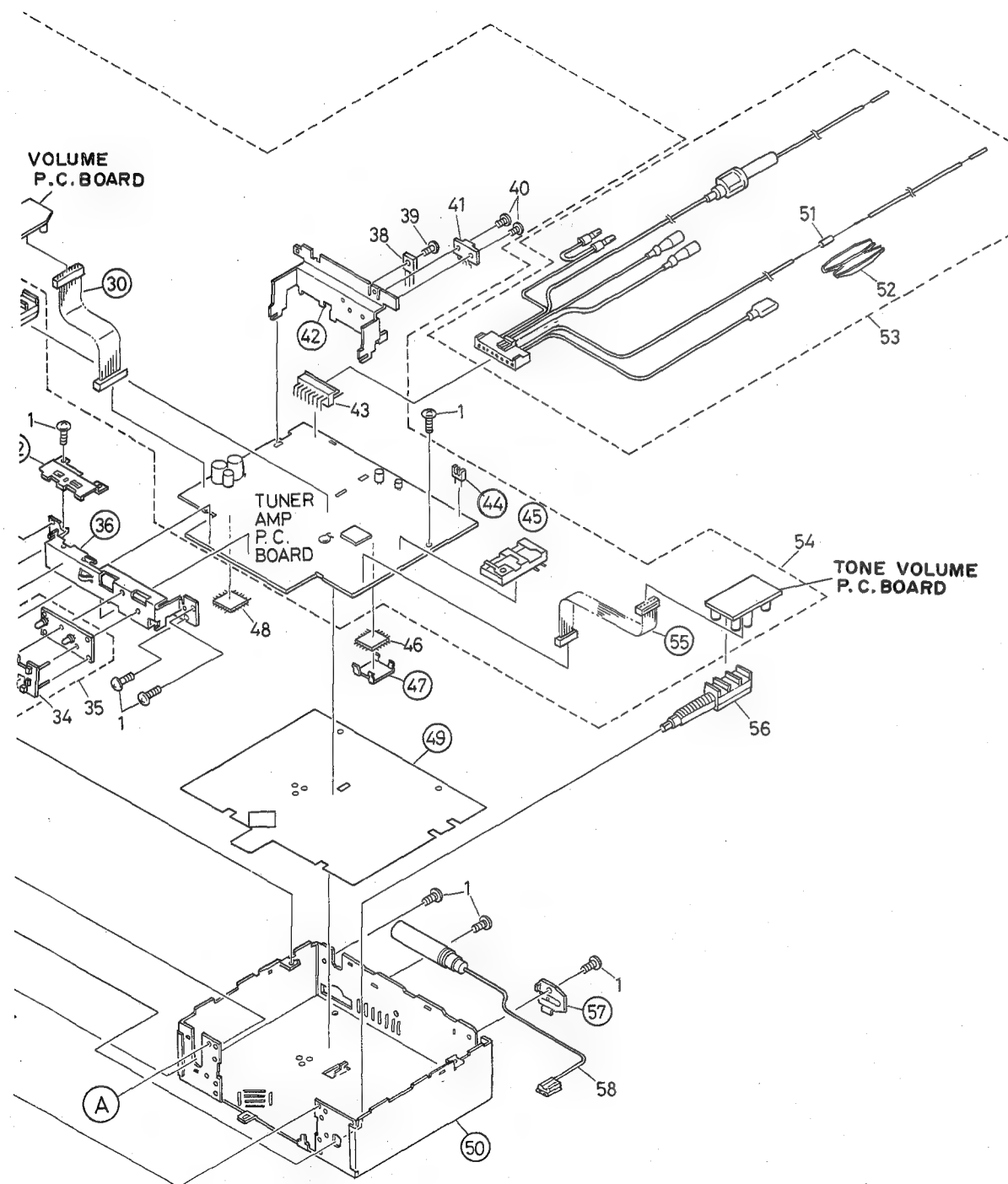


Fig. 9

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

• Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw	BMZ26P050FMC	36	Bracket	
● 2	Cassette Mechanism Assy	EXK1710	37	.....	
3	Button(EJ)	CAC2669	38	Transistor	2SD1684
4	Button(REW)	CAC2667	39	Screw	BMZ30P080FMC
			40	Screw	BMZ30P050FMC
5	Button(FF)	CAC2666	41	IC	TA7280P
6	Bracket		42	Bracket	
7	Knob	CAA1239	43	Plug	CKS-465
8	Knob	CAA1238	44	Plug	
9	Nut	CBN1001	45	Case	
10	Case		46	IC	PAC001A
11	Bracket		47	Shield	
12	Clamper	CEF-007	48	IC	PD4275
13	Holder		49	Insulator	
14	Plate		50	Chassis	
15	Panel	CNS2209	51	Resistor	RS1/2P102JL
16	Lens	CNV2602	52	Cap	CNS1472
17	LCD	CAW1116	53	Cord Assy	CDE3139
18	Spring	CBH1396	● 54	Tuner Amp Unit (KE-2033, 2828/UC)	CWM2521
19	Door	CAT1361			
20	Button(1)	CAC2658		Tuner Amp Unit (KE-2033/XSG, KE-2828/XSG)	CWM2566
21	Button(2)	CAC2659			
22	Button(3)	CAC2660		Tuner Amp Unit (KE-2828/ES)	CWM2522
23	Button(4)	CAC2661			
24	Button(5)	CAC2662			
25	Button(6)	CAC2663	55	Connector	
26	Button(BAND)	CAC2904	56	Volume	CCS1180
27	Button(SEEK)	CAC2905	57	Holder	
28	Grille Unit (KE-2033) CXA3876		58	Antenna Cable	CDH1115
	Grille Unit (KE-2828) CXA3875		59	Nut	CBN-028
29	Connector		60	Washer	CND-646
30	Connector		61	Spacer	CNC1528
31	Volume	CCS1179			
32	Bracket				
33	Screw	BMZ20P040FMC			
34	Rubber	CNV2601			
● 35	Key Board Unit (UC, ES)	CWS1193			
	Key Board Unit (XSG/UC)	CWS1195			



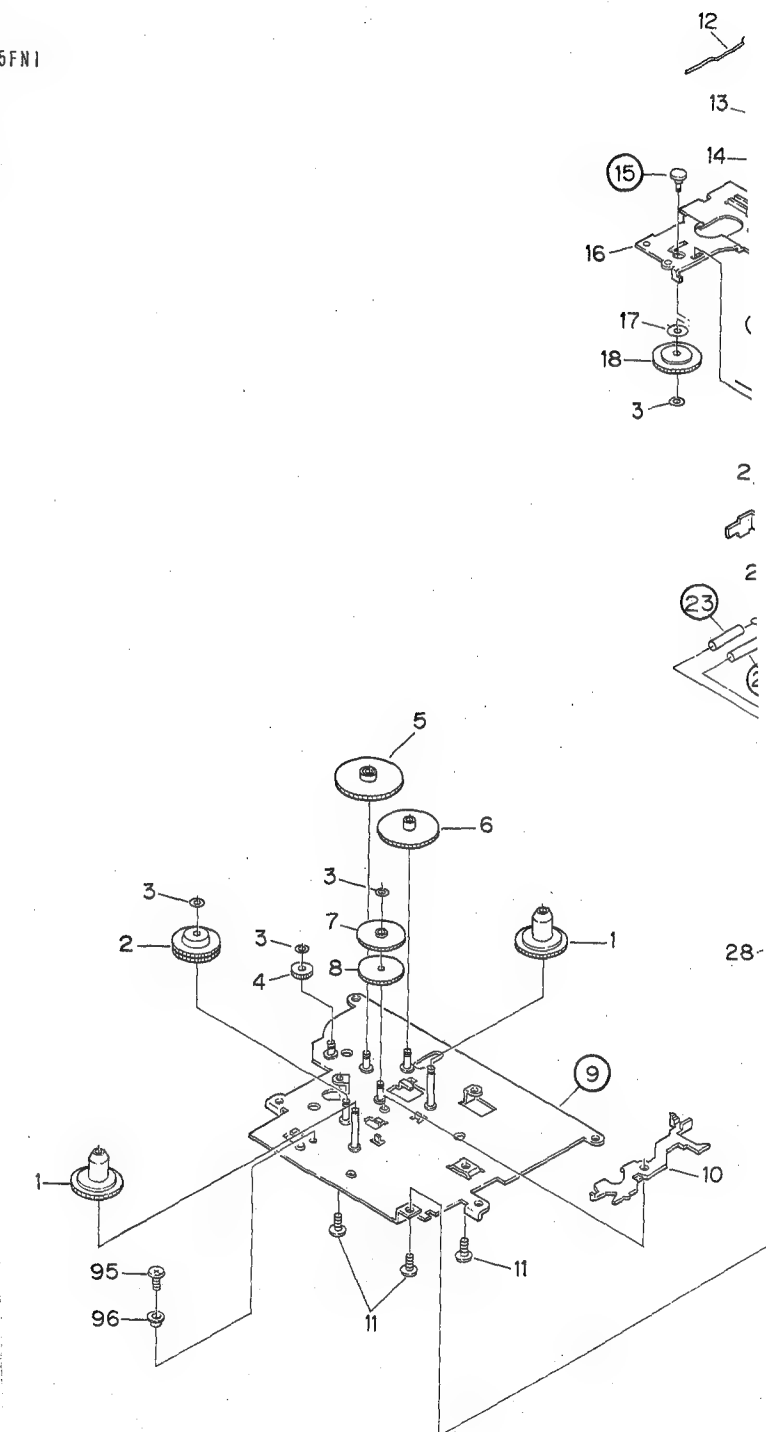
## 9. CASSETTE MECHANISM ASSY EXPLODED VIEW

### • Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Reel Unit	EXA1167	46	Switch	ESH1004
2	Gear Unit	EXA1159	47	Switch	CSN1005
3	Washer	CBF1037	48	Screw	CBA1025
4	Gear	ENV1230	49	Gear	ENV1229
5	Gear	ENV1203	50	Washer	CBF1038
6	Gear	ENV1204	51	Belt	ENT1020
7	Gear	ENV1212	52	Gear	ENV1209
8	Gear	ENV1211	53	Arm Unit	EXA1155
9	Sub Chassis Unit		54	Washer	YE30FUC
10	Arm	ENV1210	55	Spring	EBH1310
11	Screw	BMZ20P025FMC	56	Flywheel Unit	EXA1161
12	Spring	EBH1304	57	Belt	ENT1018
13	Screw	JFZ20P040FNI	58	Arm	ENV1206
14	Collar	ELA1220	59	Spring	EBH1317
15	Shaft		60	Gear	ENV1205
16	Lever	ENC1202	61	Chassis Unit	
17	Washer	EBF1015	62	Screw	JFZ20P025FNI
18	Gear	ENV1268	63	.....	
19	Spring	EBH1313	64	Pulley	ENV1207
20	Spring	EBH1314	65	.....	
21	Lever	ENC1208	66	.....	
22	Spring	EBH1307	67	Plug	
23	Tube		68	P. C. Board	
24	Spring	EBH1306	69	Switch	ESH1003
25	.....		70	Washer	WH23FMC
26	Lever	ENC1209	71	Screw	BSZ23P040FMC
27	Spring	EBH1316	72	Screw	CBA1015
28	Arm	ENC1222	73	Head Unit	EXA1163
29	Spring	EBH1308	74	P. C. Board	ENP1042
30	Washer	YE15FUC	75	Switch	ESH1005
31	Arm	ENC1221	76	Washer	YE20FUC
32	Spring	EBH1305	77	Pinch Roller Unit	EXA1154
33	Frame	ENC1204	78	.....	
34	Arm	ENC1215	79	.....	
35	Shaft	ELA1251	80	Arm	ENC1213
36	Holder	ENC1205	81	Screw	CBA1038
37	Spring	EBH1344	82	Arm	ENV1227
38	Lever	ENV1222	83	Spring	EBH1312
39	Head Base Unit	EXA1152	84	Arm	ENC1212
40	Tube		85	Spring	EBH1309
41	Spring	EBH1315	86	Lever	ENC1206
42	Motor Unit	EXA1162	87	Spring	EBH1309
43	Screw	PMS26P025FUC	88	Lever	ENC1207
44	Screw	CBA1054	89	.....	
45	P. C. Board		90	Pinch Roller Unit	EXA1153

### • Cassette Mechanism Assy

Mark No.	Description	Part No.
91	.....	
92	Arm	ENC1220
93	Spring	EBH1311
94	Collar	ELA1229
95	Screw	JGZ17P035FNI
96	Collar	ELA1252



• Cassette Mechanism Assy

Mark No.	Description	Part No.
91	.....	
92	Arm	ENC1220
93	Spring	EBH1311
94	Collar	ELA1229
95	Screw	JGZ17P035FNI
96	Collar	ELA1252

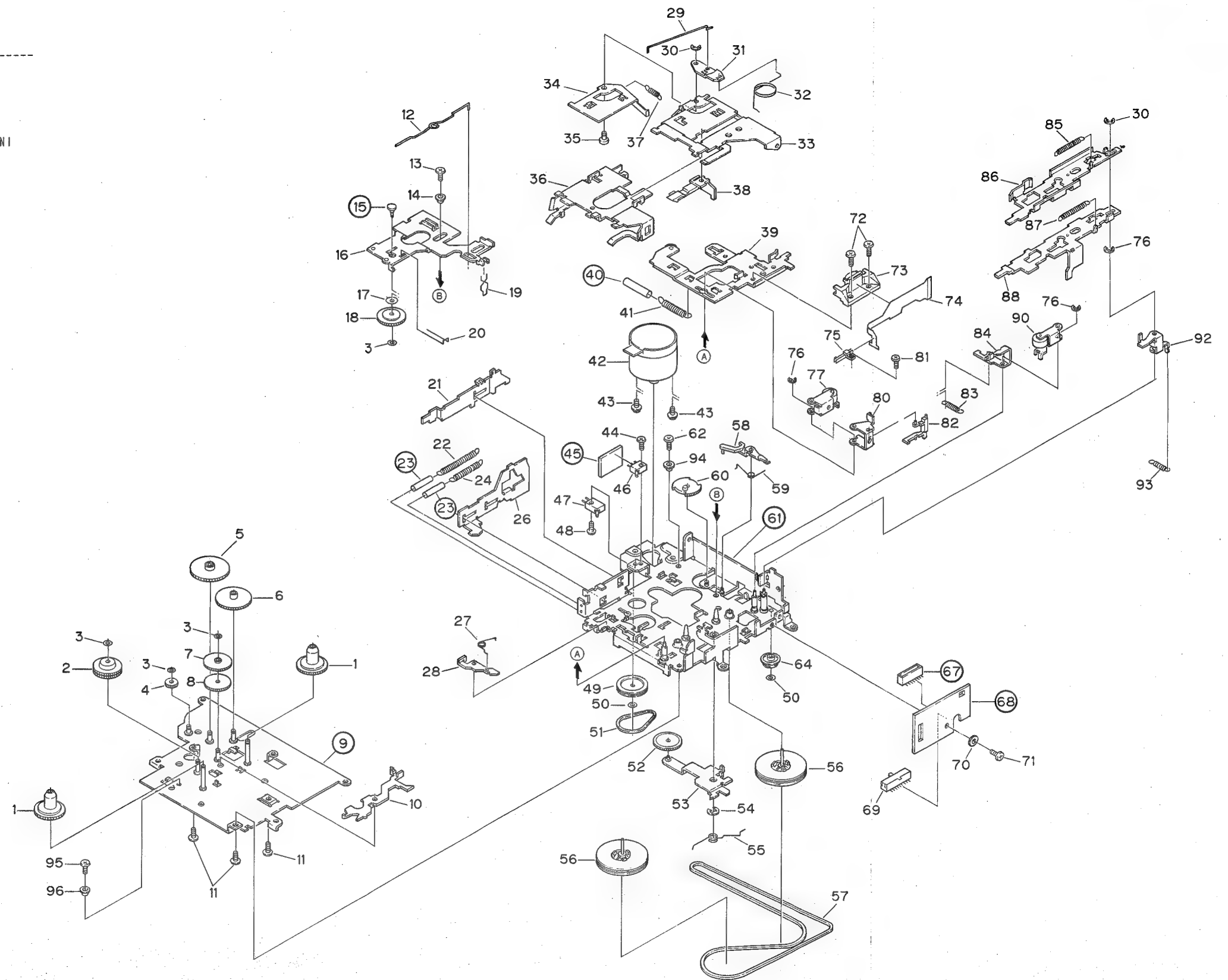


Fig. 10

## 10. PACKING METHOD

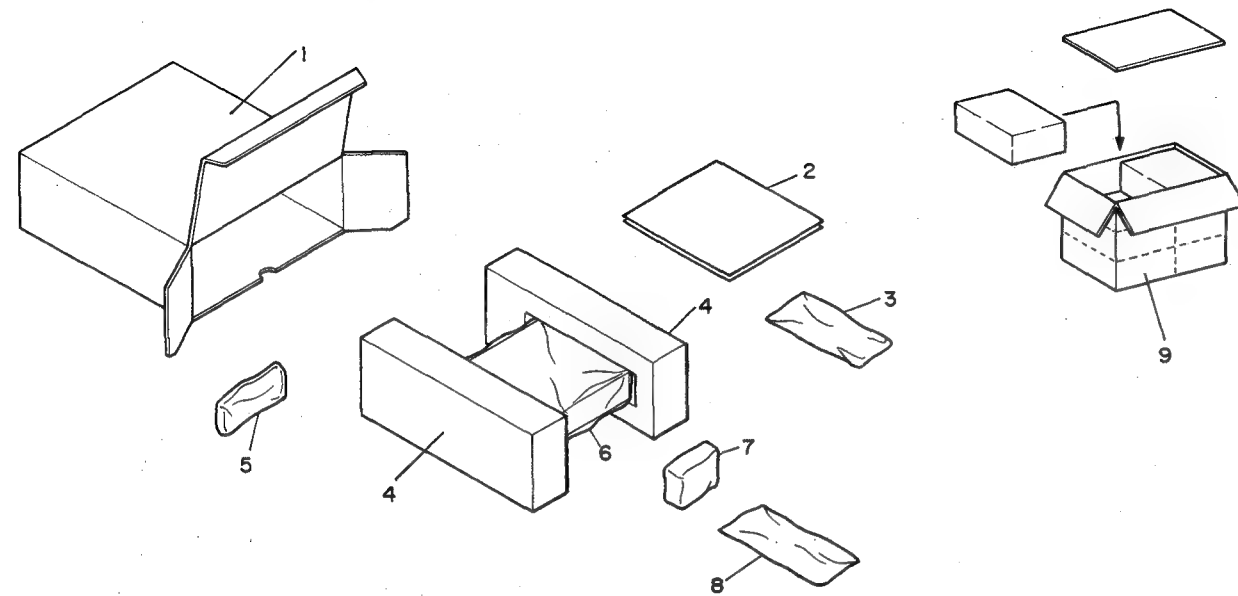


Fig. 11

## ● Parts List (KE-2033/UC)

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Carton	CHG1900	3-4-8	Screw (× 2)	PMB50Y160FMC
2-1	Owner's Manual	CRD1423	3-4-9	Washer (× 1)	WS40FMC
2-2	Card		4	Styrofoam (× 2)	CHP1376
3	Accessory Assy	CEA1617	5	Cord Assy	CDE3139
3-1	Cord	CDE1289	6	Polyethylene Bag	CEG-215
3-2	Strap	CNF-111	7	Knob Assy	CXA3859
3-3	Cover	CNS-722	7-1	Knob (× 2)	CAA1238
3-4	Screw Assy		7-2	Knob (× 2)	CAA1239
3-4-1	Screw for Strap (× 1)	CBA-028	8	Panel Assy	CXA4065
3-4-2	Nut (× 4)	CBN-028	8-1	Plate	
3-4-3	Nut (× 2)	CBN1001	8-2	Panel	CNS2209
3-4-4	Spacer (× 2)	CNC1528	9	Contain Box	CHL1900
3-4-5	Spacer (× 10)	CND-646			
3-4-6	Nut (× 1)	NF40FMC			
3-4-7	Nut (× 2)	NF50FMC			

NSP: Non spare part

	KE-2033/UC	KE-2828/UC	KE-2828/ES	KE-2033/XSG	KE-2828/XSG
No. Description	Part No.	Part No.	Part No.	Part No.	Part No.
1 Carton	CHG1900	CHG1899	CHG1901	CHG1917	CHG1916
2-1 Owner's Manual	CRD1423	CRD1422	CRD1424	CRD1443	CRD1442
2-2 Card	NSP	NSP	---	NSP	NSP
3 Accessory Assy	CEA1617	CEA1617	CEA1617	CEA1612	CEA1612
4 Styrofoam (× 2)	CHP1376	CHP1376	CHP1376	CHP1383	CHP1383
9 Contain Box	CHL1900	CHL1899	NSP	CHL1917	CHL1916

## \*Owner's Manual

Part No.	Model	Language
CRD1423	KE-2033/UC	English, French, Spanish
CRD1422	KE-2828/UC	English, French
CRD1424	KE-2828/ES	English, French, Spanish, Arabic
CRD1442	KE-2828/XSG	English, French
CRD1443	KE-2033/XSG	English, French, Spanish

## 11. ELECTRICAL PARTS LIST

## NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

## Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

## Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Unit Number :

Unit Name : Tuner Amp Unit (KE-2033/UC, /XSG/UC, 2828/UC, XSG/UC)

Tuner Amp Unit
Consists of
• Tuner Amp P. C. Board
• Volume P. C. Board
• Tone Volume P. C. Board

## MISCELLANEOUS

Mark	-----	Circuit Symbol & No.	-----	Part Name	Part No.	Mark	-----	Circuit Symbol & No.	-----	Part Name	Part No.
IC	1				PAC001A	Q	201			2SK435	
IC	251				LA3161P	Q	202	503	522	2SC2458	
IC	551				TA7280P	Q	251			2SD1992A	
IC	951				PD4275	Q	455	456	501	DTC343TS	
Q	1			Chip Transistor	3SK195	Q	457	913		DTC124ES	
Q	2				2SC2999	Q	502			2SK330	
Q	3				2SA1309A	Q	911			2SD1684	
Q	151			Chip Transistor	2SC2712	Q	912			2SA1150	
Q	152			Chip Transistor	DTA124EK	Q	951			DTC114ES	
Q	153			Chip Transistor	DTC124EK	Q	952			DTA124ES	

Mark -----

D 1  
D 2  
D 5  
D 151  
D 201

D 205  
D 252  
D 457  
D 501  
D 901

D 951  
D 959  
D 961  
D 967  
D 979

L 1  
L 2  
L 3  
L 4  
L 5

L 6  
L 201  
L 202  
L 203  
L 901

L 951  
T 1  
T 51  
T 201  
T 202

T 203  
T 205  
T 206  
T 210  
TC 951

CF 1  
CF 51  
CF 201  
H 1  
X 151

X 951  
VR 151  
VR 152  
VR 451  
VR 452

## RESISTORS

Mark -----

R 1  
R 2  
R 4  
R 6  
R 8

R 9  
R 10  
R 13  
R 14  
R 15

R 16  
R 18  
R 20  
R 21  
R 22

NSP:Non spare part

No.	Description	Part No.	Part No.	Part No.	Part No.	Part No.
		KE-2033/UC	KE-2828/UC	KE-2828/ES	KE-2033/XSG	KE-2828/XSG
1	Carton	CHG1900	CHG1899	CHG1901	CHG1917	CHG1916
2-1	Owner's Manual	CRD1423	CRD1422	CRD1424	CRD1443	CRD1442
2-2	Card	NSP	NSP	----	NSP	NSP
3	Accessory Assy	CEA1617	CEA1617	CEA1617	CEA1612	CEA1612
4	Styrofoam(× 2)	CHP1376	CHP1376	CHP1376	CHP1383	CHP1383
9	Contain Box	CHL1900	CHL1899	NSP	CHL1917	CHL1916

\*Owner's Manual

Part No.	Model	Language
CRD1423	KE-2033/UC	English, French, Spanish
CRD1422	KE-2828/UC	English, French
CRD1424	KE-2828/ES	English, French, Spanish, Arabic
CRD1442	KE-2828/XSG	English, French
CRD1443	KE-2033/XSG	English, French, Spanish

## 11. ELECTRICAL PARTS LIST

NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

Chip Resistor

RS1/8S□□□J, RS1/10S□□□J

Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

Unit Number :

Unit Name : Tuner Amp Unit(KE-2033/UC, /XSG/UC, 2828/UC, XSG/UC)

Tuner Amp Unit
Consists of
• Tuner Amp P.C. Board
• Volume P.C. Board
• Tone Volume P.C. Board

MISCELLANEOUS

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
IC	1		PAC001A	Q	201		2SK435
IC	251		LA3161P	Q	202 503 522		2SC2458
IC	551		TA7280P	Q	251		2SD1992A
IC	951		PD4275	Q	455 456 501		DTC343TS
Q	1	Chip Transistor	3SK195	Q	457 913		DTC124ES
Q	2		2SC2999	Q	502		2SK330
Q	3		2SA1309A	Q	911		2SD1684
Q	151	Chip Transistor	2SC2712	Q	912		2SA1150
Q	152	Chip Transistor	DTA124EX	Q	951		DTC114ES
Q	153	Chip Transistor	DTC124EX	Q	952		DTA124ES

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
D	1	Chip Diode	1SV128A	R	23		RD1/4PS472JL
D	2 3 4	Variable Capacitance Diode	SVC203	R	24		RD1/4PS682JL
D	5	Chip Diode	MA157-MR	R	25 223 966		RS1/10S472J
D	151		HZS4R3E	R	26 204 219 467 468		RD1/4PS103JL
D	201 202 203 204 251 451 452 453 454 456		1SS133	R	53 480		RD1/4PS104JL
D	205	Variable Capacitance Diode	KV1235Z3	R	54		RD1/4PS103JL
D	252 911		RD9R1JSB2	R	55 104 158		RS1/10S682J
D	457 458 459 954 955 958 960 963		1SS133	R	56 153		RD1/4PS562JL
D	501		RD3R0ESB2	R	57 210		RS1/10S473J
D	901 902 978		ERA15-02VH	R	58 251 252		RS1/10S513J
D	951		RD5R1JSB2	R	59 224 473 474 475 476 477 478 479		RS1/10S0R0J
D	959 962		1S1555	R	101		RS1/10S133J
D	961		RD5R6JSB2	R	102		RS1/10S682J
D	967 968		1SS133	R	103		RS1/10S183J
D	979		RD6R2JS	R	105		RS1/10S752J
L	1	Inductor	CTF1065	R	154 351 352		RS1/10S332J
L	2	Coil	CTC1022	R	156		RS1/10S684J
L	3	Coil	CTC1020	R	203		RD1/4PS513JL
L	4	Coil	CTC1056	R	205		RS1/10S510J
L	5	OSC Coil	CTC1024	R	220		RD1/4PS752JL
L	6	Inductor	LAU150K	R	221		RS1/10S104J
L	201	Ferri-Inductor	LAU4R7K	R	222		RD1/4PS220JL
L	202	Ferri-Inductor	LAU330K	R	253 254		RS1/10S104J
L	203	Ferri-Inductor	CTF-161	R	255 256		RS1/10S151J
L	901		CTH1084	R	257 258		RS1/10S133J
L	951	Ferri-Inductor	LAU101K	R	259 260		RS1/10S334J
T	1	Coil	CTC1064	R	262 482		RD1/4PS332JL
T	51	Coil	CTC1060	R	305 306		RD1/4PS153JL
T	201	Coil	CTB1056	R	453 454		RD1/4PS272JL
T	202	Coil	CTB1008	R	459 460		RD1/4PS333JL
T	203 204	Coil	CTB1058	R	469 470		RS1/10S222J
T	205	Coil	CTE1041	R	471 472 481 914 960		RD1/4PS222JL
T	206	Coil	CTE1042	R	503 506 971		RD1/4PS102JL
T	210	Coil	CTB1061	R	504 961		RD1/4PS472JL
TC	951	Trimmer	CCG-070	R	505 551 552		RD1/4PS152JL
CF	1	Ceramic Filter	CTF-182	R	553 554 902 953		RS1/10S0R0J
CF	51 52	Ceramic Filter	CTF1130	R	555 556		RS1/10S133J
CF	201	Filter	CTF1085	R	557		RD1/4PS010JL
H	1		DSP-201M	R	559		RD1/4PS682JL
X	151		CSS1066	R	582		RS1/8S472J
X	951	Crystal Resonator	CSS1011	R	901		RD1/2PS3R3JL
VR	151		VRMB6VS154	R	903 915		RS1/8S0R0J
VR	152		VRMB6VS333	R	911		RS1/10S471J
VR	451		CCS1180	R	912		RD1/4PS221JL
VR	452		CCS1179	R	951		RD1/4PS471JL
		LCD	CAW1116	R	959		RD1/4PS222JL
				R	964		RD1/4PS331JL
				R	968		RD1/4PS122JL
				R	969 970		RD1/4PS102JL

RESISTORS

Mark	Circuit Symbol & No.	Part Name	Part No.	Mark	Circuit Symbol & No.	Part Name	Part No.
R	1 3 5		RS1/10S223J	C	1 3 17 56 203		CCSQCH220J50
R	2		RD1/4PS151JL	C	2 53 58 205 225 226 232 902 954 955		CKSQYB473K25
R	4 159		RS1/10S333J	C	4 25		CCSQCH330J50
R	6 955 956 967		RD1/4PS473JL	C	5 207 209		CCSQTH090D50
R	8		RS1/10S563J	C	6		CCSQTH070D50
R	9 52		RD1/4PS563JL	C	7 202		CKSQYB222K50
R	10 157 160 201 202 211 913		RS1/10S103J	C	8 22 51 54 59 105 204 216 227 229		CKSQYB223K50
R	13 17		RD1/4PS271JL	C	9		CCSQTH150J50
R	14		RS1/10S561J	C	10		CCSQSL271J50
R	15		RS1/10S683J	C	11 19 101 154 154 201 502		CKSQYB103K50
R	16		RS1/10S474J				
R	18 51 310		RS1/10S331J				
R	20 155		RS1/10S182J				
R	21		RS1/10S101J				
R	22		RS1/10S223J				

CAPACITORS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
C	12	24			CCSQCH470J50
C	13	224			CEA3R3M50LS
C	14	959 960 961			CKSQYB102K50
C	15				CCSQCH080D50
C	16				CCSQCH100D50
C	18				CCSQCH120J50
C	20				GKSQYF104Z50
C	21	23			CKSYB223K50
C	27	52 912 958			CEA101M10LS
C	55	155 156 157 468			CEA010M50LS2
C	57	222			CEAR47M50LS2
C	60				CCDLH910J50
C	61				CKSYB473K50
C	102	206 262			CEA470M16LS
C	103				CKSQYB182K50
C	104				CKSQYB682K50
C	106	165			CKSQYB102K50
C	151	152 230			CKSQYB223K50
C	153				CKSQYB332K50
C	158	463 464			CEAR22M50LS2
C	159				CEA0R1M50LS2
C	161	310 313 314 467			CEA100M16LS2
C	162	163 465 466			CKSQYB152K50
C	208				CCSQCH010C50
C	217				CCSORH101J50
C	218				CCSQUJ180J50
C	228				CEA220M16LS
C	231				CQPA43102A
C	251	252			CKSQYB102K50
C	253	254			CEANL2R2M50LL
C	255	256			CEA470M10LS
C	257	258			CKSQYB103K50
C	261				CEA221M10L2
C	459	460			CKSYB473K50
C	461	462			CEA2R2M50LS2
C	503		4.7 $\mu$ F/16V		CCH1005
C	551	552			CKSQYB102K50
C	553	554			CEA010M50L2
C	555	556			CEA221M10L2
C	557	558			CEA470M10L2
C	559	560 565			CQEA224J63
C	561	562			CEA102M10L2
C	563				CEA470M16L2
C	901				CEA222M16L2
C	903				CEA101M16L2
C	904				CEA221M16L2
C	911				CEA331M10L2
C	951				CCSQCH100D50
C	956				CEA471M6R3L2

Tuner Amp Unit	KE-2033/UC	KE-2828/ES
Symbol & No.	Part No.	Part No.
D952	-----	1SS133
D954	1SS133	-----
R56	RD1/4PS562JL	RD1/4PS153JL
R310	RS1/10S331J	RS1/10S221J
R467, 468	RD1/4PS103JL	RD1/4PS562JL
C151, 152	CKSQYB223K50	CKSQYB153K50

Unit Number :  
Unit Name : Key Board Unit

## MISCELLANEOUS

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
	IL	901 902		Lamp 14V 40mA	CEL1004

Unit Number :  
Unit Name : P. C. Board (A)

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
	S	2		Switch (FWD/REV)	ESH1003

Unit Number :  
Unit Name : P. C. Board (B)

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
	S	3		Switch (TAPE/TUN)	ESH1004
	S	4		Switch (MUTE)	CSN1005

## Miscellaneous Parts List

Mark	====	Circuit Symbol & No.	====	Part Name	Part No.
	S	1		Switch (MUTE)	ESN1005
	M	1		Motor Unit	EXA1162
	HD	1		Head Unit	EXA1163

# Service Manual

ORDER NO.  
**CRT1328**

## CASSETTE MECHANISM ASSEMBLY

# CX-197

### NOTE

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for the model under repair.

Model	Service Manual	Cassette Mechanism Assembly
KE-1700B/IT KE-1700SDK/WG KE-1730B/EW KE-2700B/IT KE-2700SDK/WG KE-2730B/EW	CRT1325	EXK1710
KE-1700QR/UC KE-2303QR/UC KE-2750QR/ES	CRT1327	EXK1710
KE-2033/UC KE-2033/XSG/UC KE-2828/XSG/UC KE-2828/ES, UC	CRT1331	EXK1710
KE-3838/UC, ES KE-3838/XSG/UC KE-3838/XML/UC	CRT1332	EXK1710
KE-1700B/XML/IT	CRT1336	EXK1710
KE-1730B/XIB KE-1730B/XML/EW KE-1730B/XSG/EW	CRT1337	EXK1710
KE-2630B/XIB KE-2730B/XIB	CRT1340	EXK1710

Model	Service Manual	Cassette Mechanism Assembly
KE-17000R/XML/UC	CRT1339	EXK1710
KE-3700SDK/WG KE-3730B/EW KE-3700B/IT	CRT1326	EXK1720
KE-27000R/UC KE-37000R/UC KE-37500R/ES	CRT1327	EXK1720
KE-4848/ES, UC KE-4848/XML/UC KE-4848/XSG/UC	CRT1330	EXK1720
KE-250/US KE-3033/UC KE-3033/XSG/UC	CRT1332	EXK1720
KE-3730B/XIB	CRT1338	EXK1720
KE-4500R/US	CRT1327	EXK1750
KE-350/US	CRT1330	EXK1750

## 1. DISASSEMBLY

*Note: Always use new washer and E washer at the time of reassembling.*

### ● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

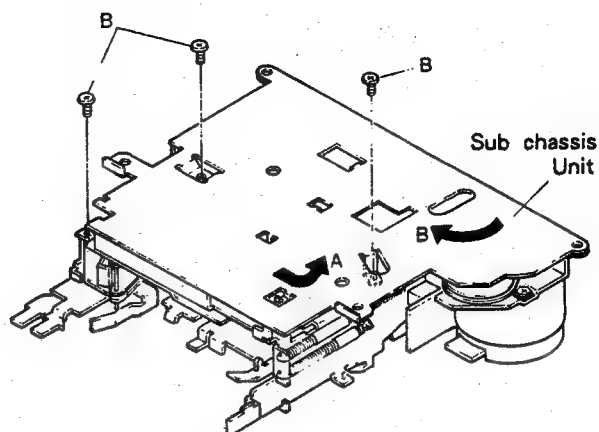


Fig. 2

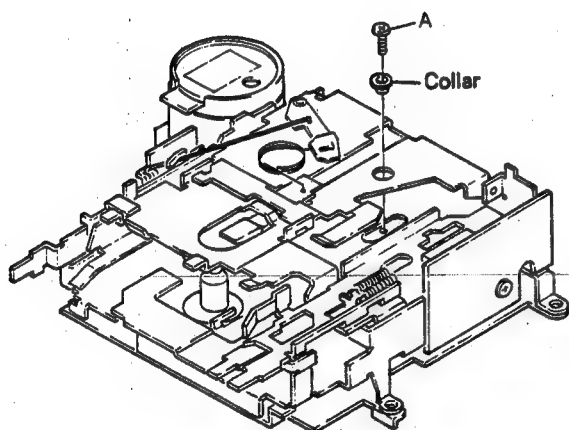


Fig. 1

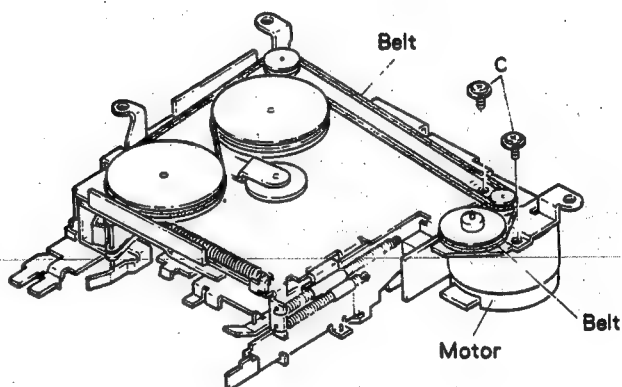


Fig. 3

# ● How to Remove the Pinch Roller Unit and Head

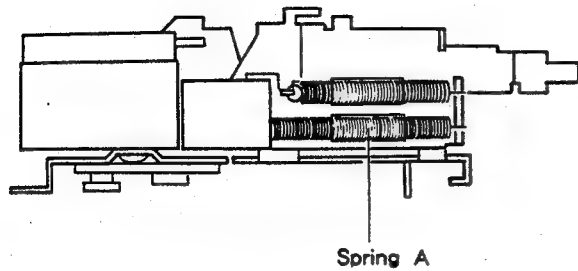


Fig. 4

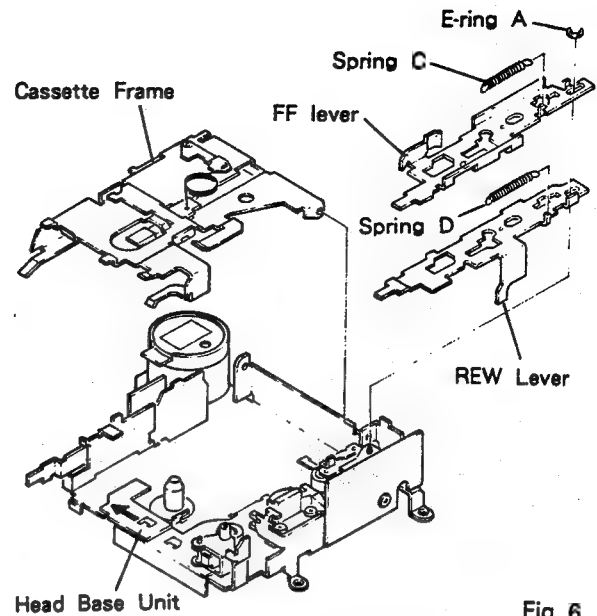


Fig. 6

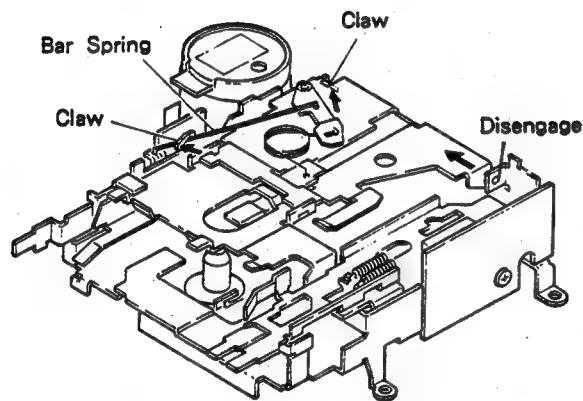


Fig. 5

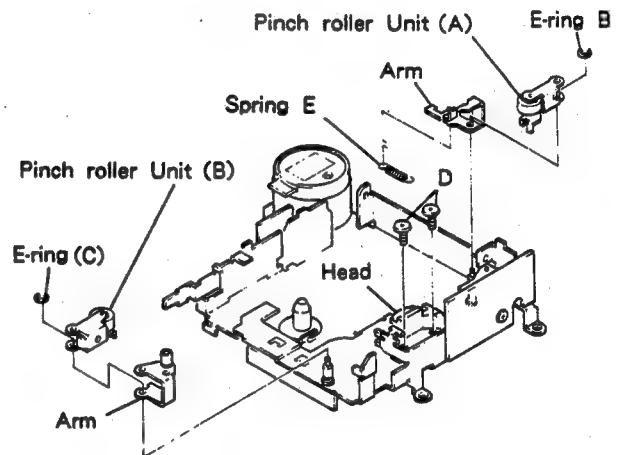


Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)



## 2. ADJUSTMENT

### 2.1 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p>■ Tape speed deviation:  <math>3,000 \begin{smallmatrix} +90 \\ -30 \end{smallmatrix} \text{ Hz}</math>  <math>(4.76 \text{ cm/s} \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \%)</math></p> <p>Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 – 6 seconds.</p>	<p>■ Wow and flutter:          Less than 0.2% (WRMS)</p> <p>Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 – 6 seconds.</p>
<p>■ Fast forward and rewinding time:          100 – 120 seconds</p> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.</p>	<p>■ Winding torque:          35 – 65g · cm</p> <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 – 6 seconds.</p>	<p>■ F.F. torque:          70 – 120g · cm</p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p>■ REW torque:          70 – 120g · cm</p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p>■ Back tension torque:          2 – 6g · cm</p> <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p>■ Cassette loading force:          Less than 0.7 kg</p> <p>Push the center of the cassette and measure the force with a tension meter (3 kg).</p>

## 2.2 AZIMUTH ADJUSTMENT

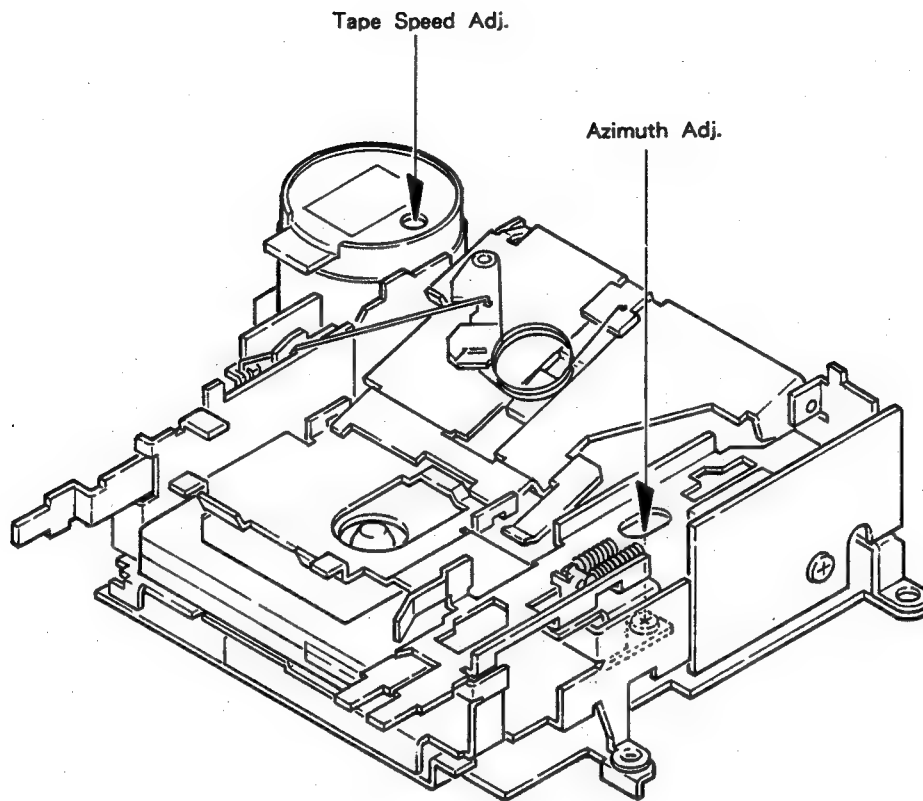


Fig. 8

### ● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, - 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

## 2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, - 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, - 40Hz).

### 3. MECHANISM DESCRIPTION

● Loading operation

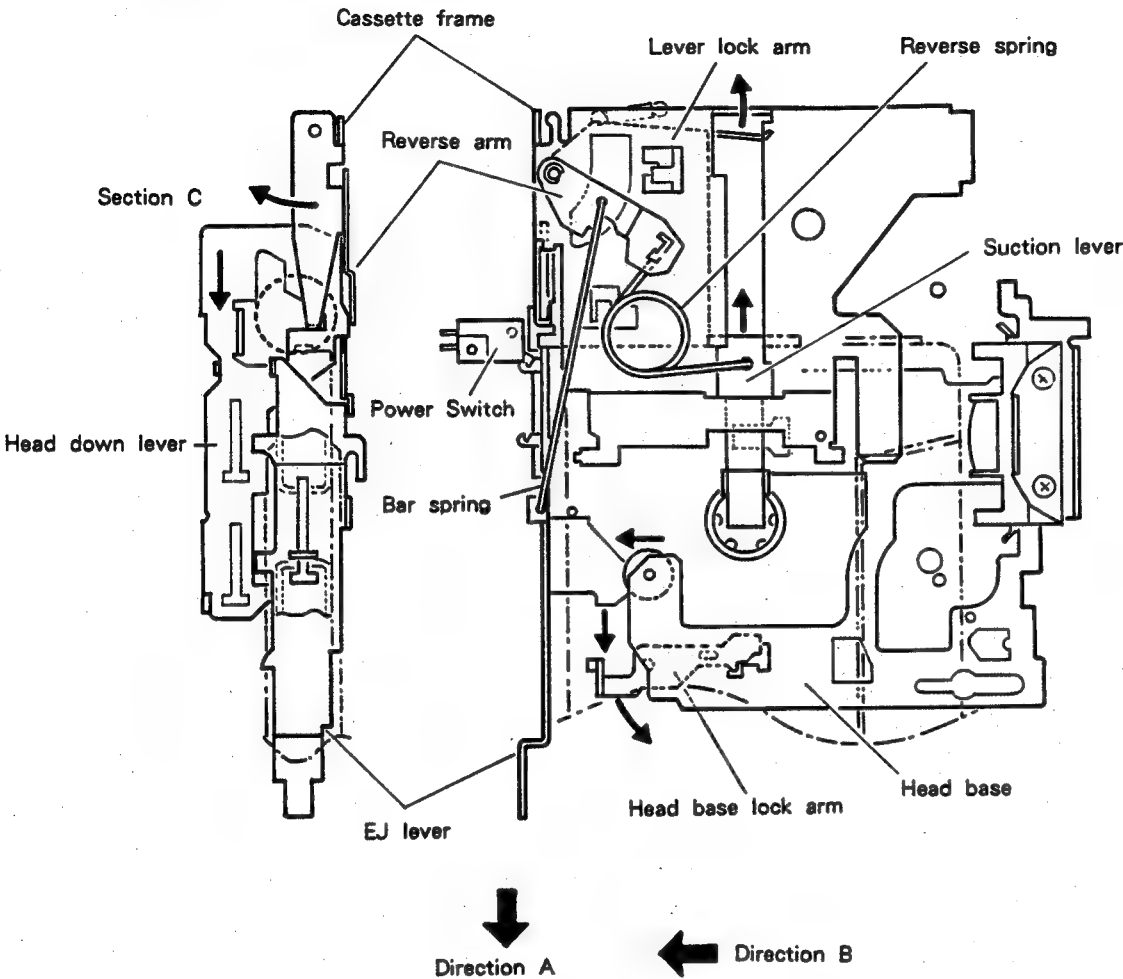


Fig. 9

1. A cassette tape, when inserted, pushes a suction lever.  
The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

# ● MS Operation (EXK1720, EXK1750)

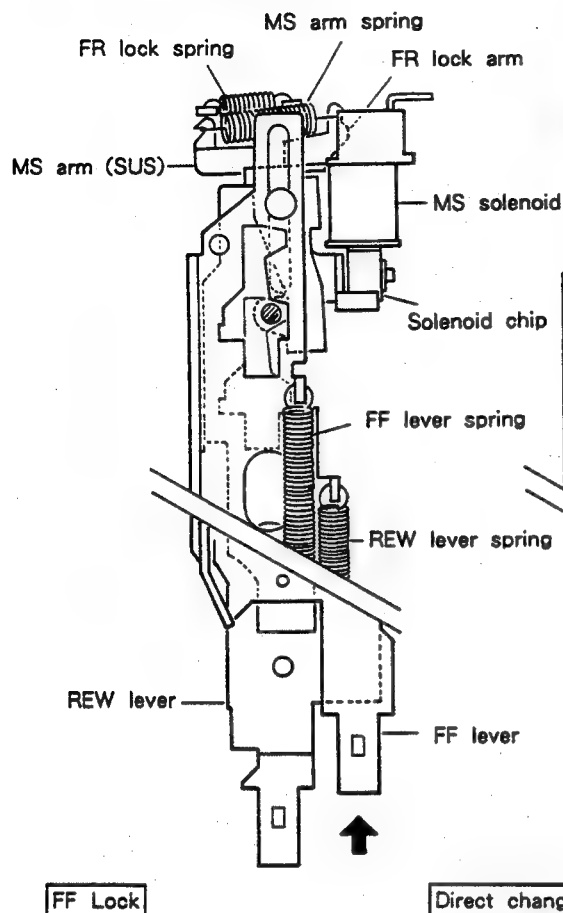


Fig. 10

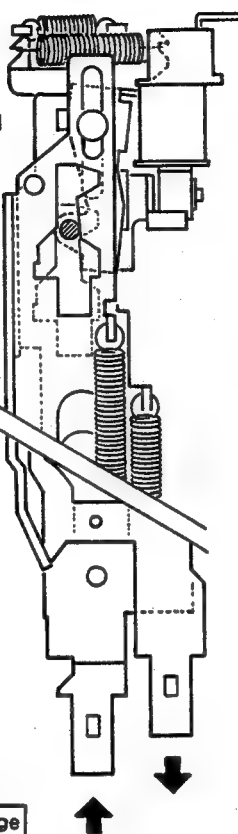


Fig. 11

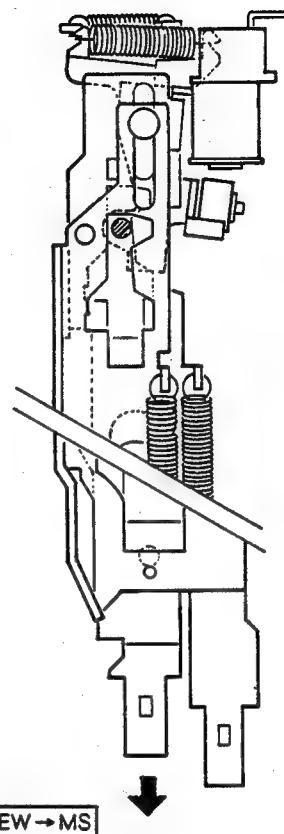


Fig. 12

1. The MS solenoid is normally energized to attract the solenoid chip during play and F/R operation. The solenoid chip applies counterclockwise force to the MS arm, thereby putting the FR lock arm into rotation via the MS arm spring. The MS lock shaft of FR lock arm unit catches a taper in a different hole of the FF (or REW) lever to lock the FF (or REW) lever.
2. In case of direct change, pressing the unlocked FF or REW lever causes the lever taper to turn the FR lock arm clockwise. This in turn presses the MS arm spring and FR lock spring to release the locked lever.
3. When the no recording section is caught and the power supply to the solenoid is cut off, the solenoid loses the attraction force and disables locking of the F/R lever. As a result, the F/R lever is unlocked. (This unlocking occurs because the force to retain the lever cannot be generated by the FR lock spring only.)

## ● Direction Changeover Operation

### (1) FWD play operation

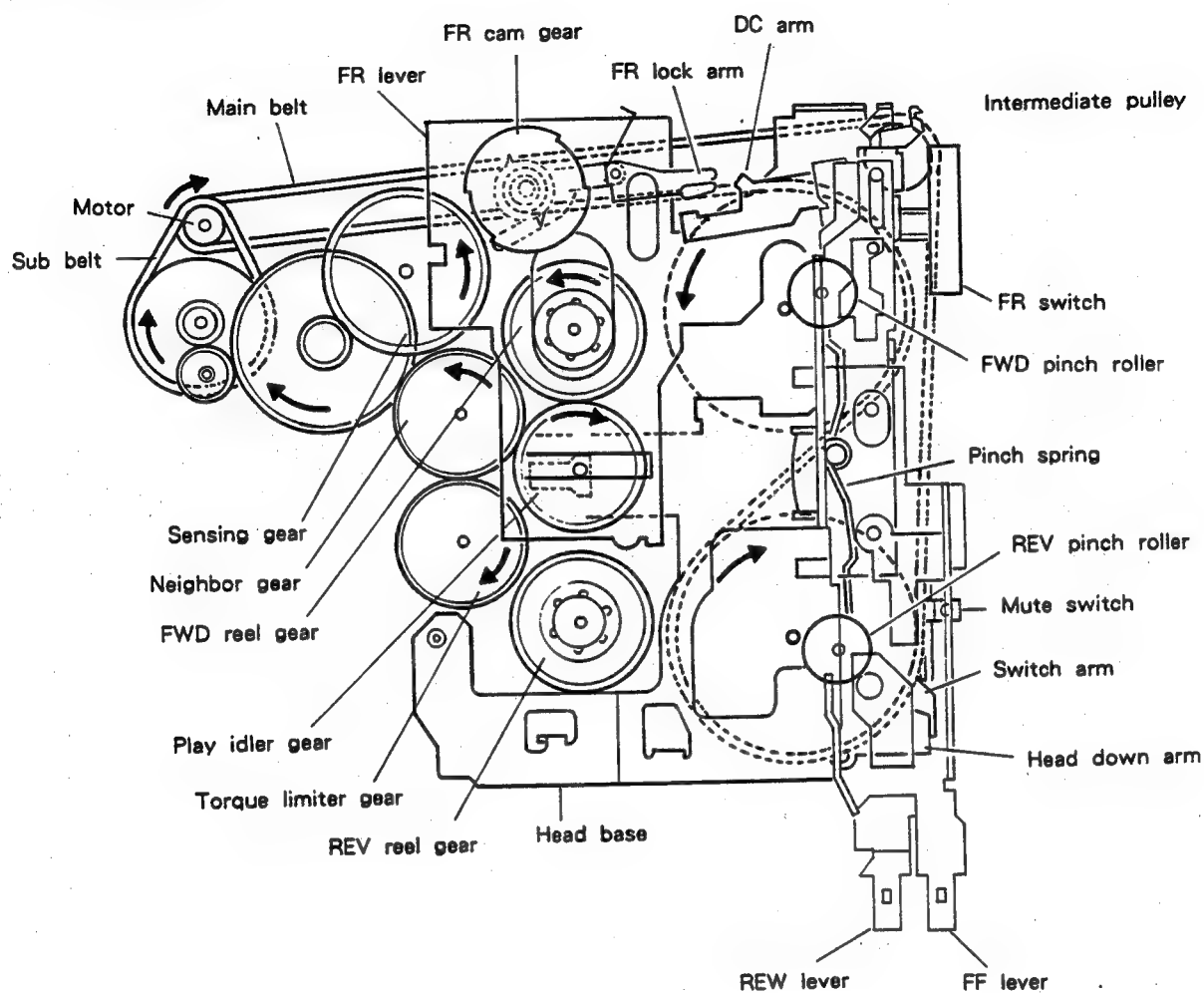


Fig. 13

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

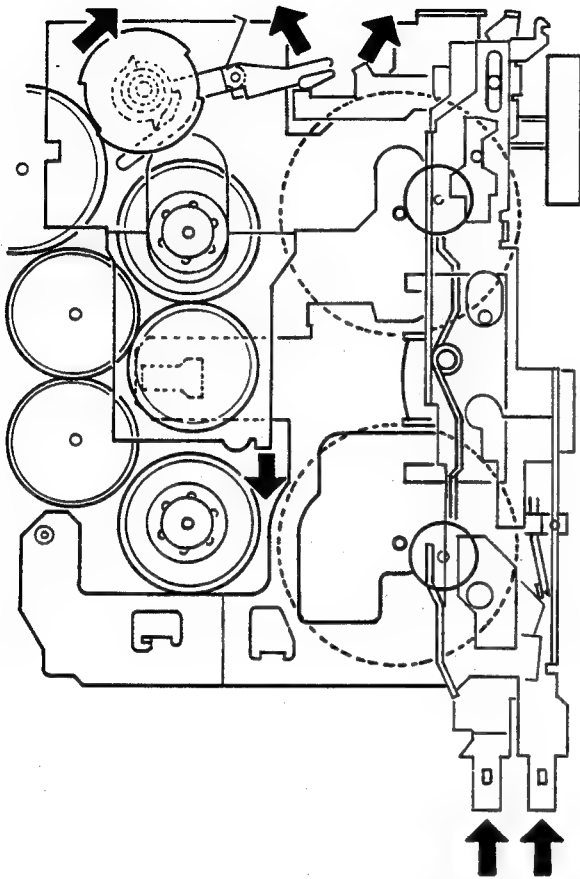
**(2) Direction change operation**

Fig. 14

The direction is changed by pressing FF and REW levers simultaneously. The DC arm turns along a cam groove of FF and REW levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear. As a result, the FR lever moves downward.

When FF and REW levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REW levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REW levers are pressed. (Fig.14)

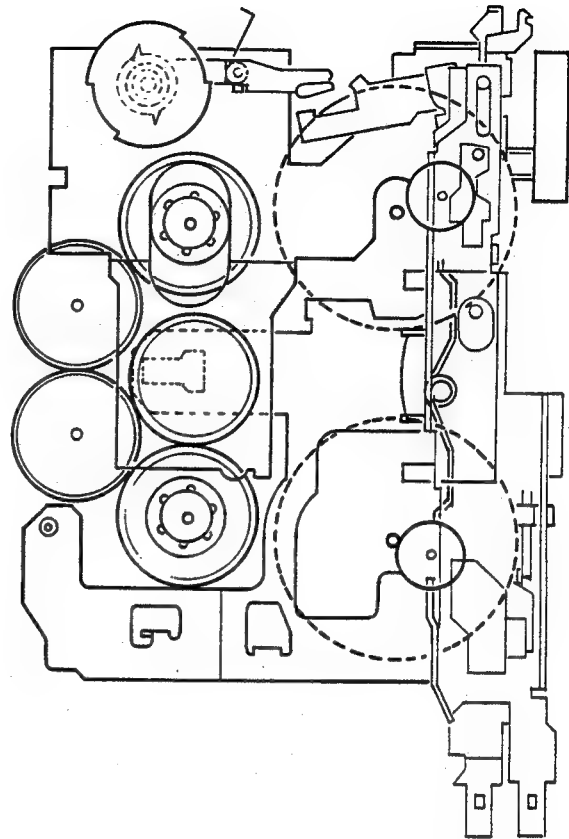
**(3) REV play operation**

Fig. 15

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and play idler gear. With FF and REW levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

# ● FF/REW Operation

## (1) FWD play operation

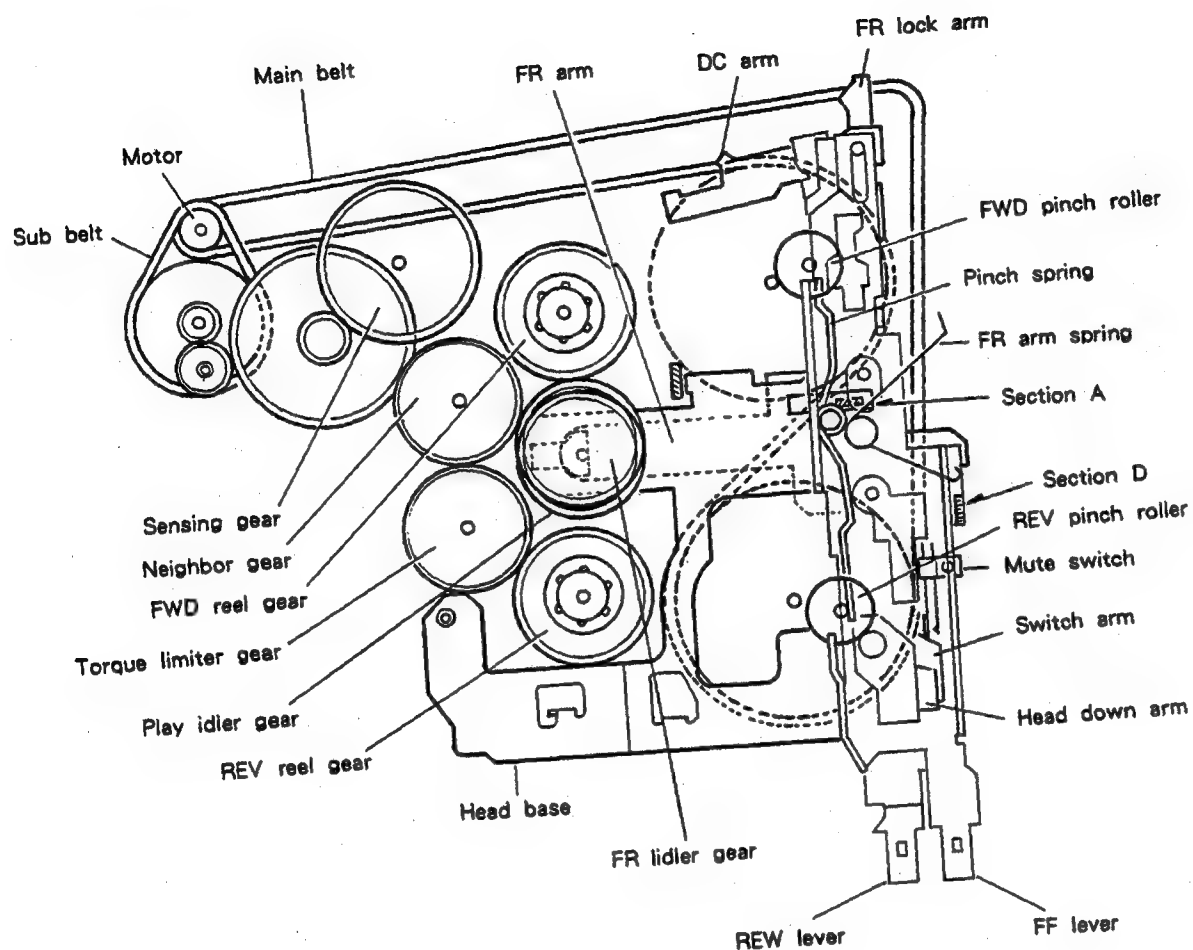


Fig. 16

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

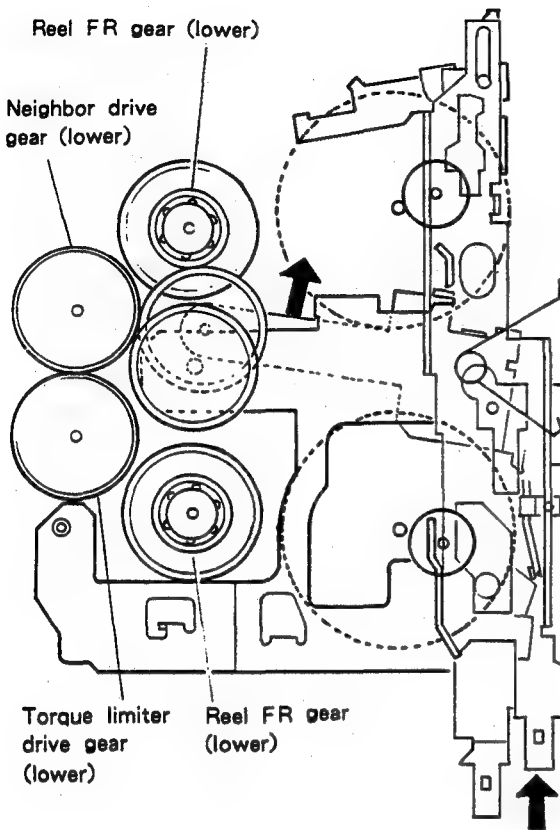
**(2) FF Operation**

Fig. 17

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.17)

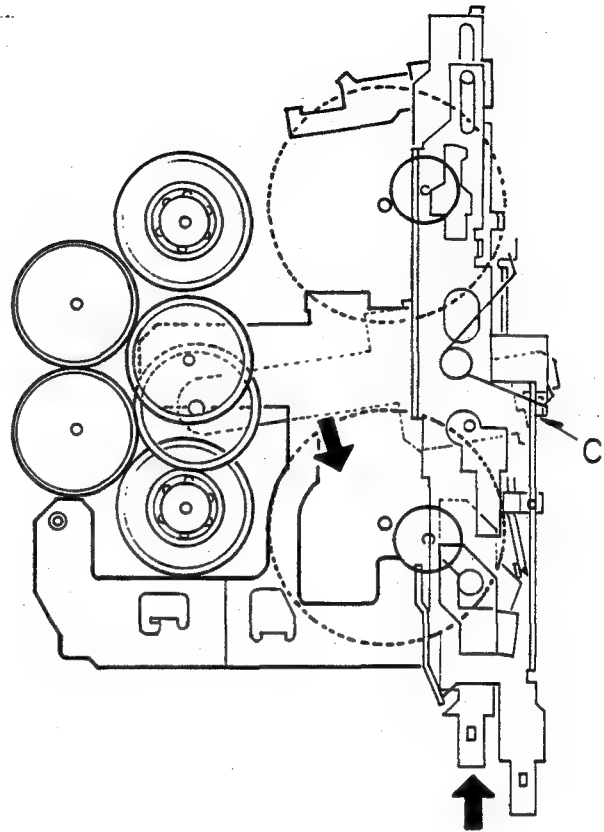
**(3) REW operation**

Fig. 18

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

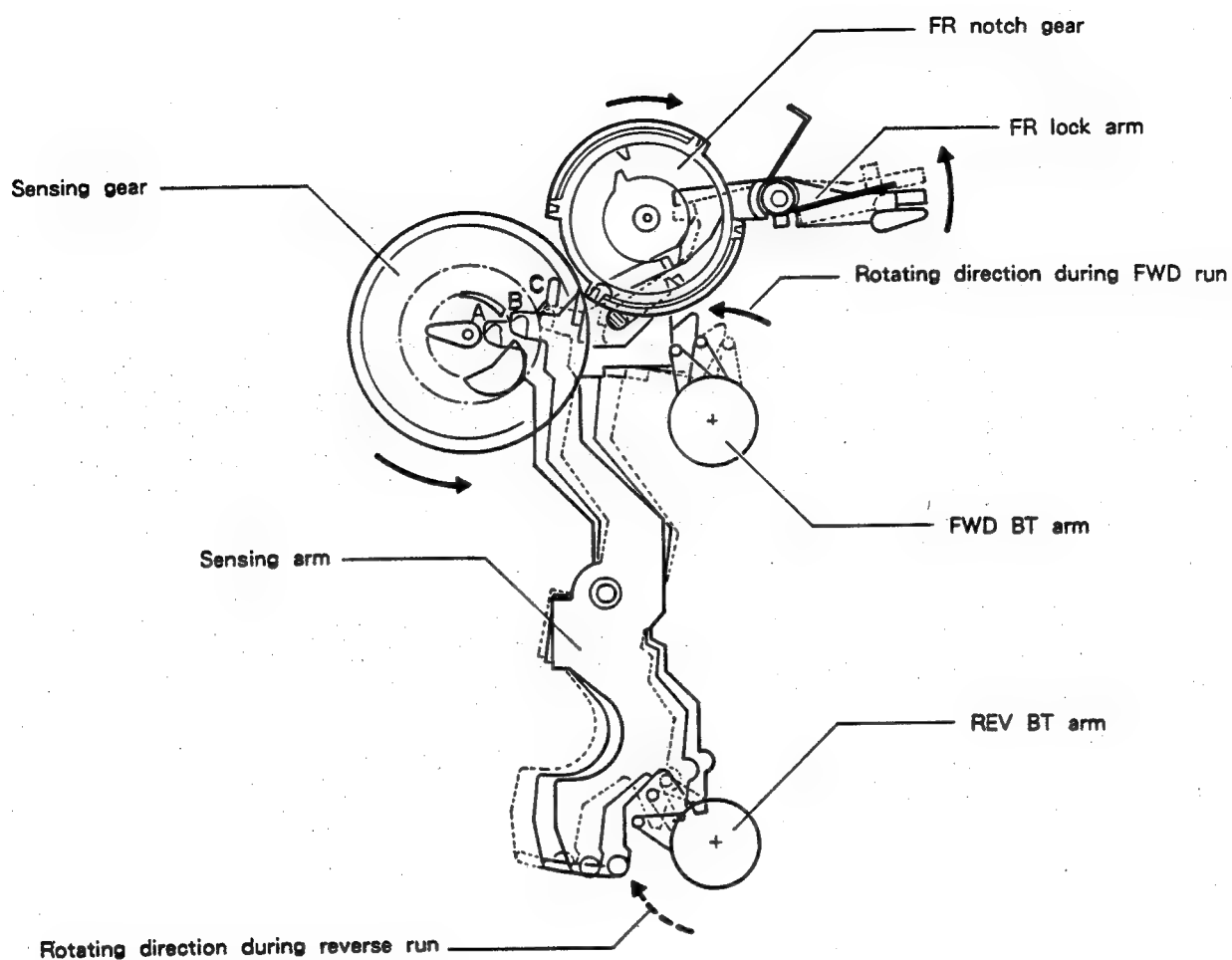
Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.18)



### ● Sensing Operation



**Fig. 19**

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).
2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.
3. Change of run direction: The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.

● ATSC Operation

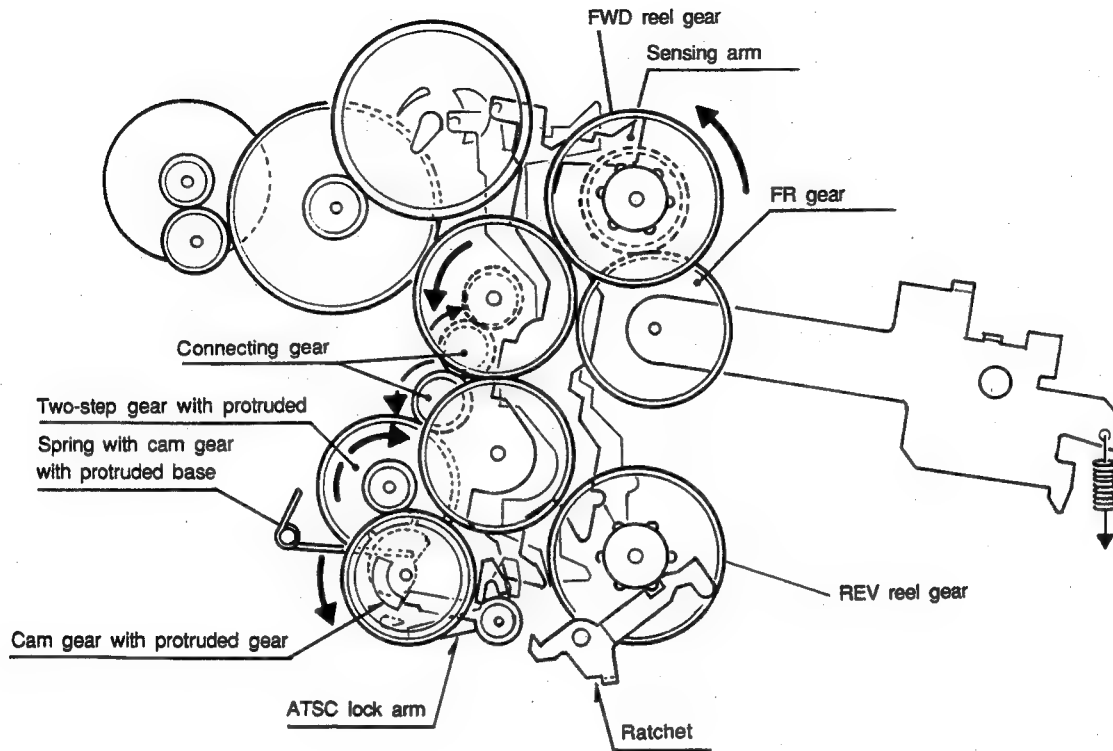
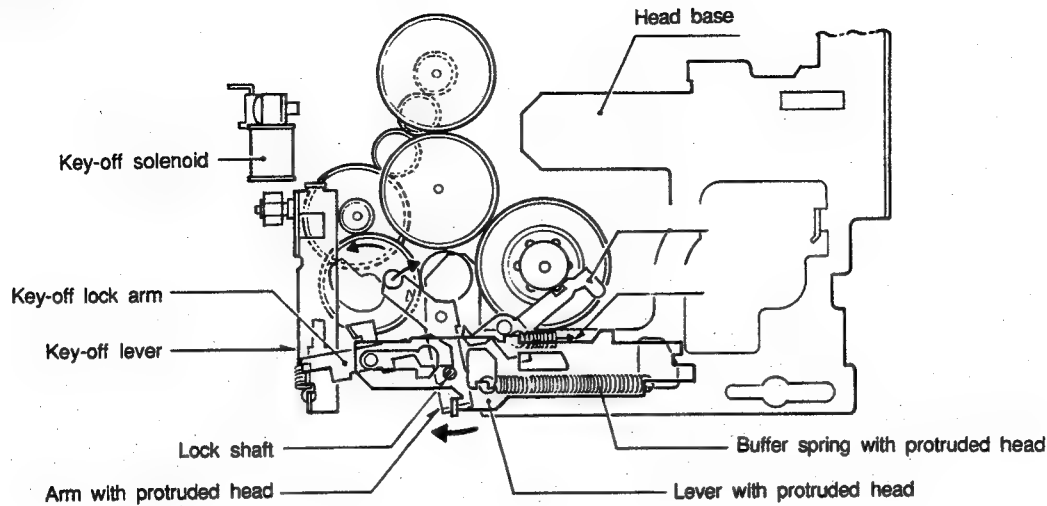


Fig. 18

1. At the position for releasing the head table, the FR gear is meshed with the FWD reel gear. Because the ratchet in the REV reel gear stops rotating, the tape must be wound up until no slack exist.
2. Because the rotation stops when no slack exists in the tape, sensing is performed. The sensing arm presses the ATSC lock arm, and the lock of the cam gear with protruded head gets out of position. Then, the cam gear is made to rotate.

# ● Key-off Operation

## Release Condition



## Play Condition

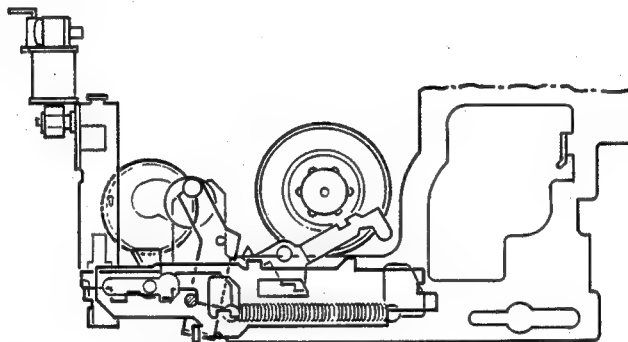


Fig. 19

1. Thrusting head: The arm with protruded head is rotated by the rotation of the cam gear with protruded head, and the lever with protruded head is pushed out. Because the lever with the protruded head and head base are connected by the buffer spring with protruded head, the head base moves forward.
2. Lock for head base: When the lever with protruded head moves forward, the lock shaft caulked by the lever with protruded head shifts. Thus, the key-off lock arm can rotate, and the key-off lever reaches the key-off solenoid

by force of a spring, and becomes attached. (Although escape power works on the key-off lock arm by force of the head return spring, the solenoid maintains it.)

### 3. Key-off:

The key-off lock arm is rotated by the power of the head return spring when the key-off solenoid is switched off, and the lever with protruded head and head base move back together.

# ● EJECT Operation

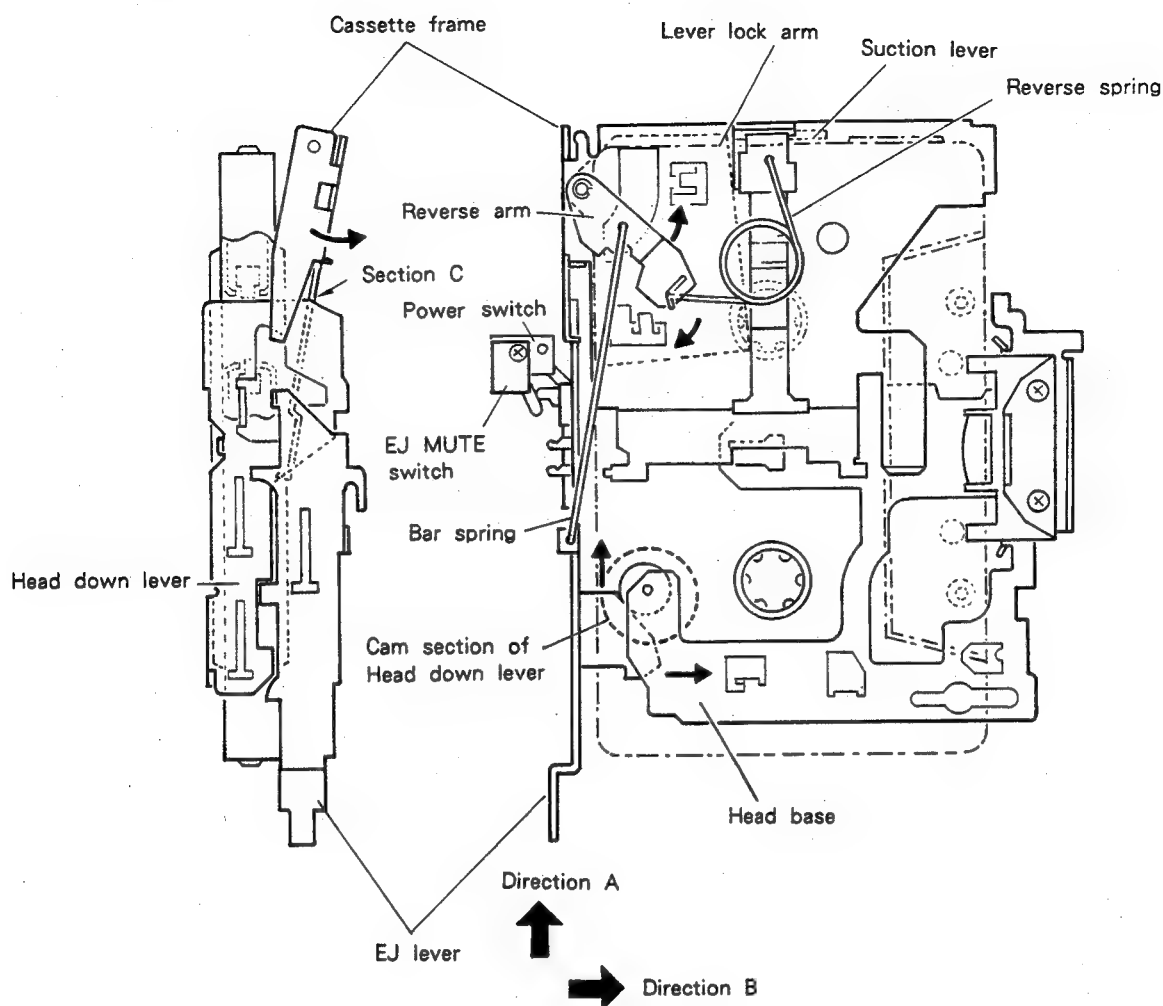


Fig. 20

1. Push the EJ lever in Direction A by hand (EJ MUTE SW ON) At the same time, the head down lever slides in Direction A.
2. The cam section of the head down lever returns the head base in Direction B (head base down operation).
3. Section C of the cassette frame is pushed up by the stroke of the head down lever (push-up operation).
4. The reverse arm is driven in a direction of arrow mark via bar spring by the EJ lever stroke.
5. The reverse spring passes through the reverse position to eject the cassette tape (eject operation).
6. With the EJ lever over-stroking, the lever lock arm can be rotated and locks the head down lever.
7. When released, the EJ lever returns and is stopped by the head down lever.

**ADDITIONAL**

 **PIONEER**  
The Art of Entertainment

# Service Manual

ORDER NO.  
**CRT1428**

CASSETTE MECHANISM ASSEMBLY

## CX-197

### NOTE

- This service manual describes operation of the cassette mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for the model under repair.
- CX197 (CRT1328) does not have a Key-off function, but the key-off function is shown in this service manual of the CX-197 (CRT1428).

Model	Service Manual	Cassette Mechanism Assembly
KEH-M7400RDS/EW	CRT1429	EXK1735

Model	Service Manual	Cassette Mechanism Assembly

**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan  
**PIONEER ELECTRONICS SERVICE INC.** P.O. Box 1760, Long Beach, California 90801 U.S.A.  
**PIONEER ELECTRONICS OF CANADA, INC.** 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada  
**PIONEER ELECTRONIC [EUROPE] N.V.** Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium  
**PIONEER ELECTRONICS AUSTRALIA PTY. LTD.** 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911  
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FU DEC. 1991 Printed in Japan

## 1. DISASSEMBLY

*Note: Always use new washer and E washer at the time of reassembling.*

### ● How to Remove the Belt and Motor

1. Remove screw A fixing the FR lever. (Fig.1)
2. Remove three screws B fixing the sub-chassis unit. Move the unit first in Direction A, then in B direction, and lift it upward for removal. (Fig.2)
3. The belt can now be removed. (Fig.3)
4. Remove two screws C. The motor can be removed. (Fig.3)

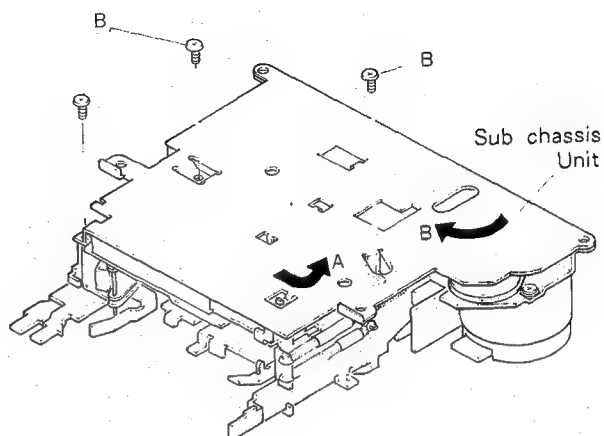


Fig. 2

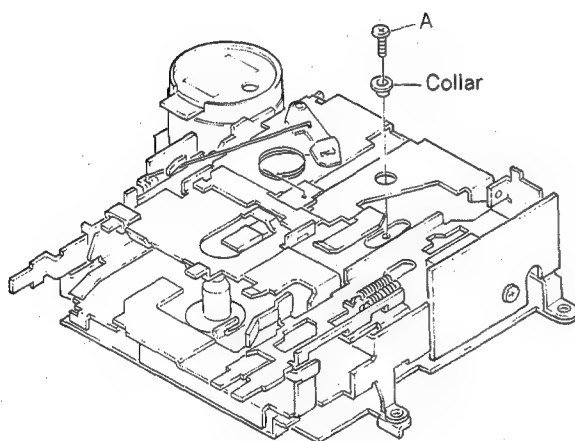


Fig. 1

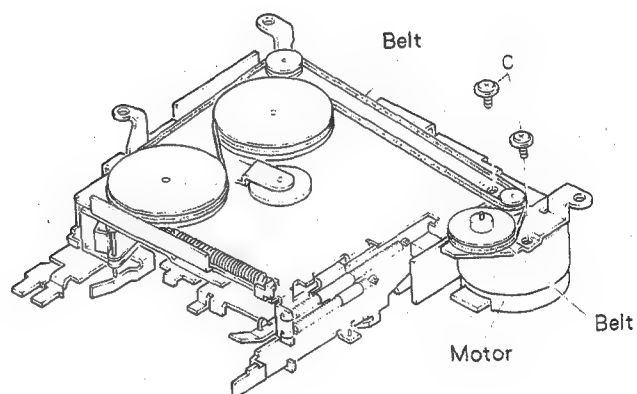


Fig. 3

# ● How to Remove the Pinch Roller Unit and Head

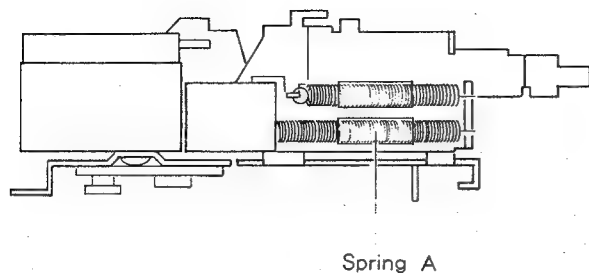


Fig. 4

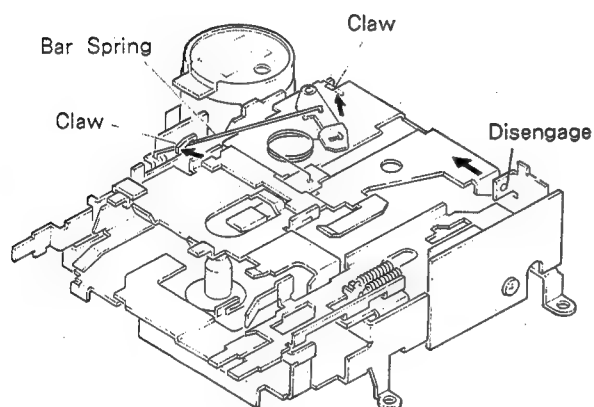


Fig. 5

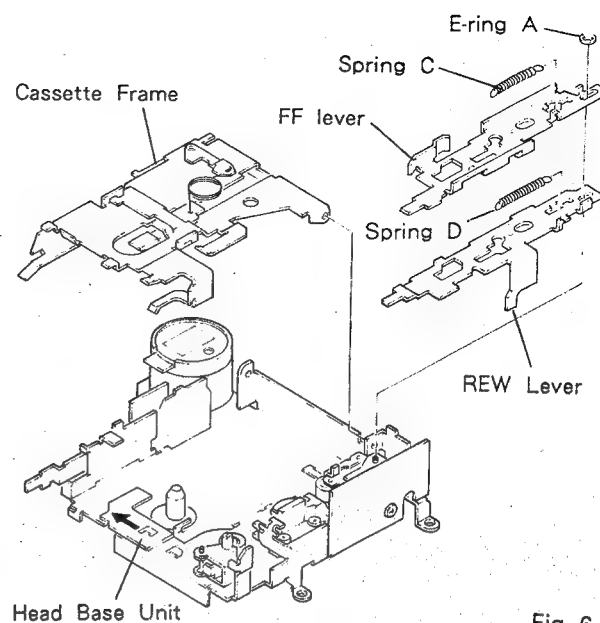


Fig. 6

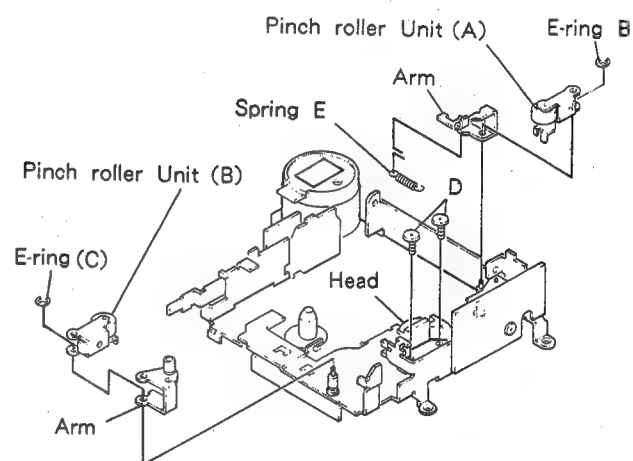


Fig. 7

1. Remove spring A. (Fig.4)
2. Extend claws (2 points). (Fig.5)
3. Remove bar Spring. (Fig.5)
4. Disengage projection by moving in a direction of arrow mark. (Fig.5)
5. The cassette frame is removed. (Fig.6)
6. Remove springs C and D. (Fig.6)
7. Remove E-ring A. (Fig.6)
8. Remove FF/REW levers. (Fig.6)
9. Move head base unit forward. (Fig.6)
10. Remove spring E. (Fig.7)
11. Remove E-ring B. The pinch roller unit (A) can be removed. (Fig.7)
12. Remove E-ring C. The pinch roller unit (B) can be removed. (Fig.7)
13. Remove two screws D. The head can be removed. (Fig.7)

## 2. ADJUSTMENT

### 2.1 CHECK POINTS OF CASSETTE MECHANISM

<p>Confirm the following items when replacing parts of the cassette mechanism.</p>	<p>■ Tape speed deviation:  <math>3,000 \begin{smallmatrix} +90 \\ -30 \end{smallmatrix} \text{ Hz}</math>  <math>(4.76 \text{ cm/s} \begin{smallmatrix} +3 \\ -1 \end{smallmatrix} \%)</math></p> <p>Using an NCT-111, measure the speed at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 – 6 seconds.</p>	<p>■ Wow and flutter:          Less than 0.2% (WRMS)</p> <p>Using an NCT-111, measure the wow and flutter at the start and end of winding and take the maximum value. If values indicated by the pointer vary considerably, adjust to 70% of the minimum and maximum values. Measuring time shall be 5 – 6 seconds.</p>
<p>■ Fast forward and rewinding time:          100 – 120 seconds</p> <p>Using a C-60, set to fast forward and rewind, and measure the time with a stop watch.</p>	<p>■ Winding torque:  <math>35 - 65 \text{ g} \cdot \text{cm}</math></p> <p>Using a cassette type torque meter (100 g·cm), measure the minimum value while in the play mode. Measuring time shall be 2.5 – 6 seconds.</p>	<p>■ F.F. torque:  <math>70 - 120 \text{ g} \cdot \text{cm}</math></p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the F.F. mode.</p>
<p>■ REW torque:  <math>70 - 120 \text{ g} \cdot \text{cm}</math></p> <p>Using a cassette type torque meter (120 g·cm), measure the value when the tape stops in the REW mode.</p>	<p>■ Back tension torque:  <math>2 - 6 \text{ g} \cdot \text{cm}</math></p> <p>After setting in the REW mode without loading a cassette tape for 5 minutes, measure the back tension torque in the play mode, using a cassette type torque meter.</p>	<p>■ Cassette loading force:          Less than 0.7 kg</p> <p>Push the center of the cassette and measure the force with a tension meter (3 kg).</p>



## 2.2 AZIMUTH ADJUSTMENT

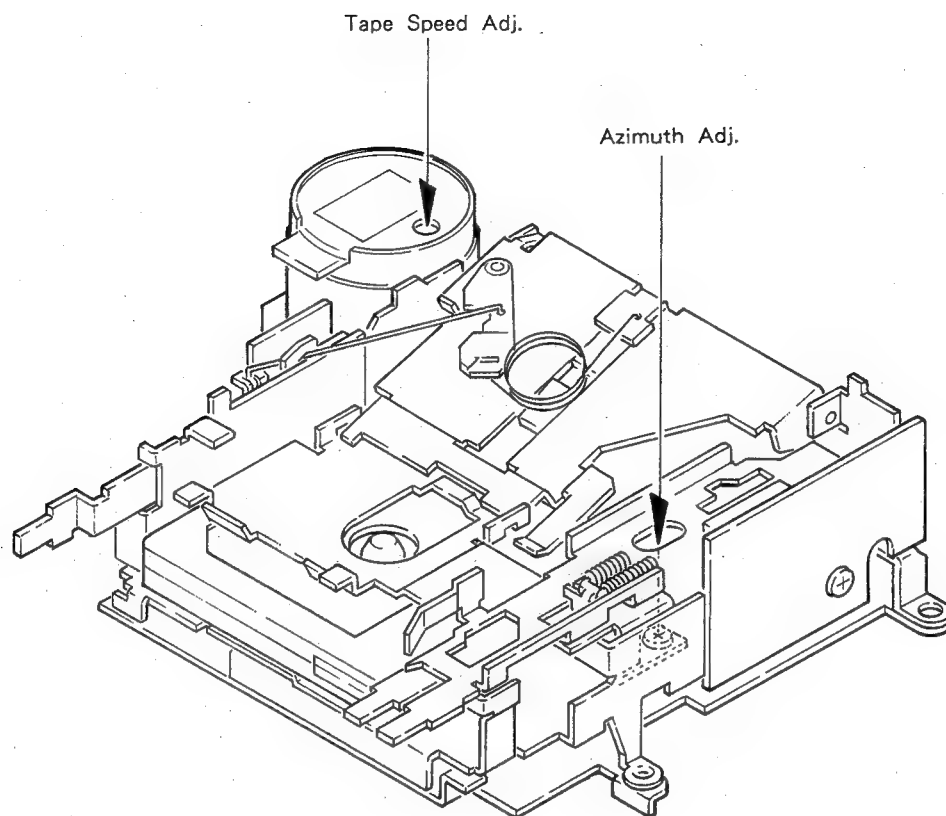


Fig. 8

### ● To Adjust (EXK1750)

1. Play "A" side of NCT-110 (10kHz, - 10dB). Adjust the screw for maximum output in forward and reverse directions.
2. Play "B" side in forward and reverse directions to confirm adjustment.

## 2.3 TAPE SPEED ADJUSTMENT

1. Reproduce NCT-111 (3kHz, - 10dB). Adjust the semifixed resistor so that frequency counter shows 3010Hz (+80Hz, - 40Hz).

### 3. MECHANISM DESCRIPTION

#### ● Loading operation

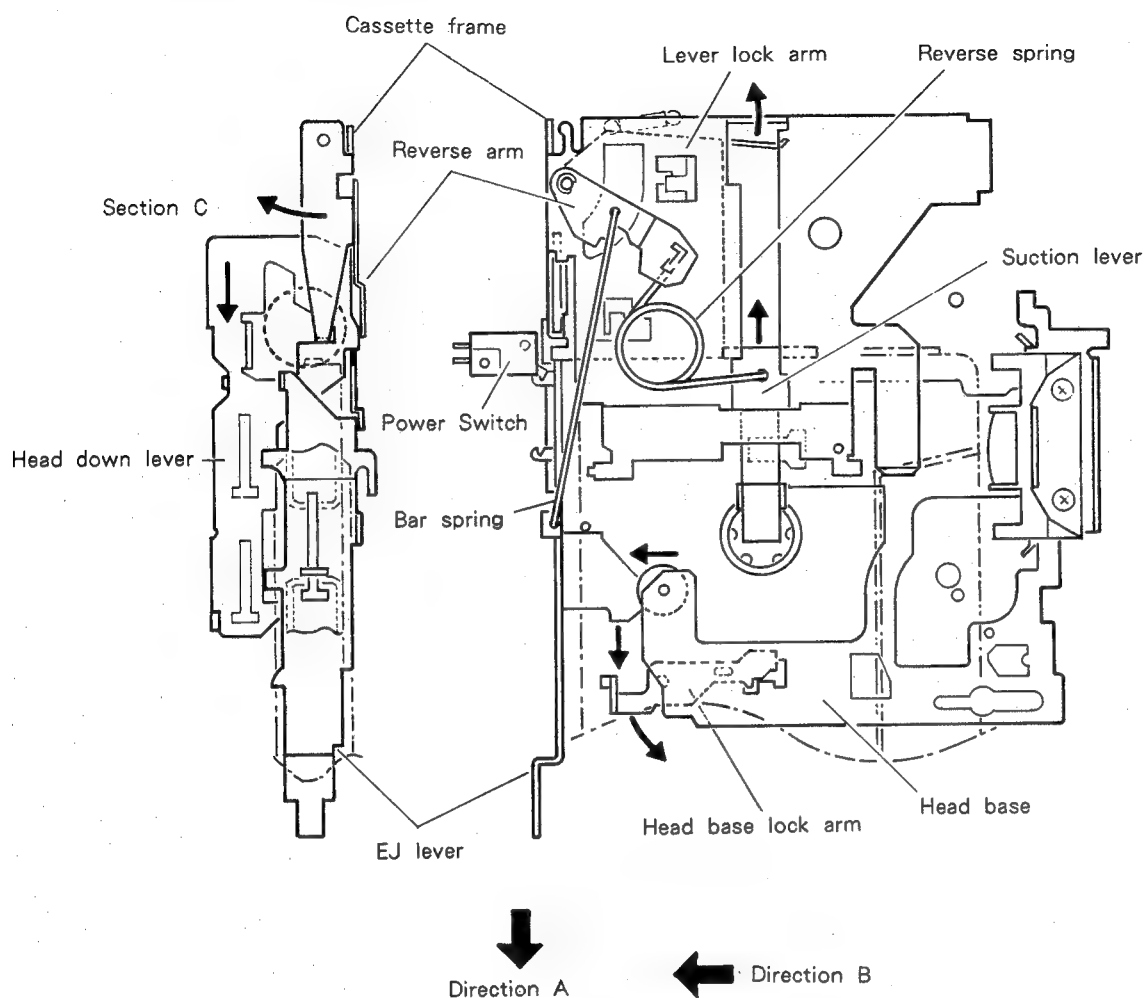


Fig. 9

1. A cassette tape, when inserted, pushes a suction lever.  
The reverse spring rotates to move past the reverse point. Then, the cassette is drawn by a force of a reverse spring (suction operation).
2. After suction, the lever lock arm is pressed to be unlocked.
3. The head down lever is unlocked and the lever moves in Direction A.
4. While moving, the EJ lever turns ON the power switch.
5. The cassette frame engaged to the section C of the head down lever turns. (Cassette drop operation)
6. At the stroke end, the head down lever turns the head base lock arm.
7. A Stopper of the head base lock arm is released, and the head base moves forward (Direction B).

● MS Operation

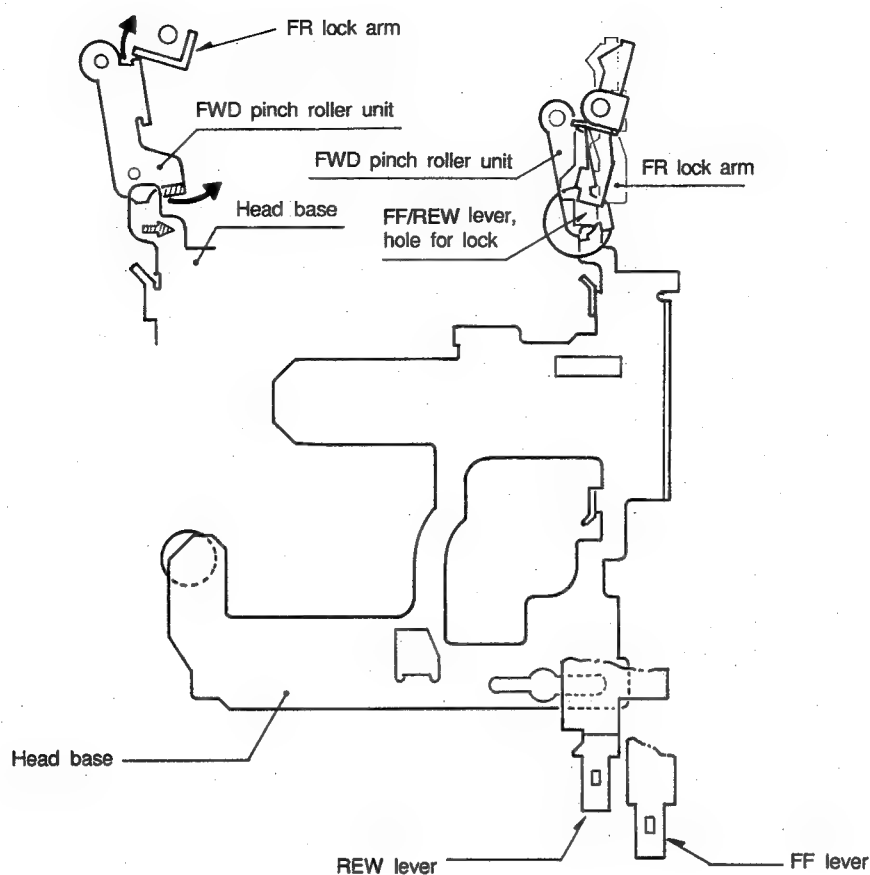


Fig. 10

The head base is moved back by switching the key-off solenoid off from the REW or FF condition, and is lowered (rotated) FWD pinch roller unit. The FWD pinch roller unit presses the bending part of FR lock arm to make it rotate in the direction that releases the lock. The lock of the FF/REW lever is consequently released.

Subsequently, the head comes out from the ATSC to enable PLAY condition.

● Direction Changeover Operation

(1) FWD play operation

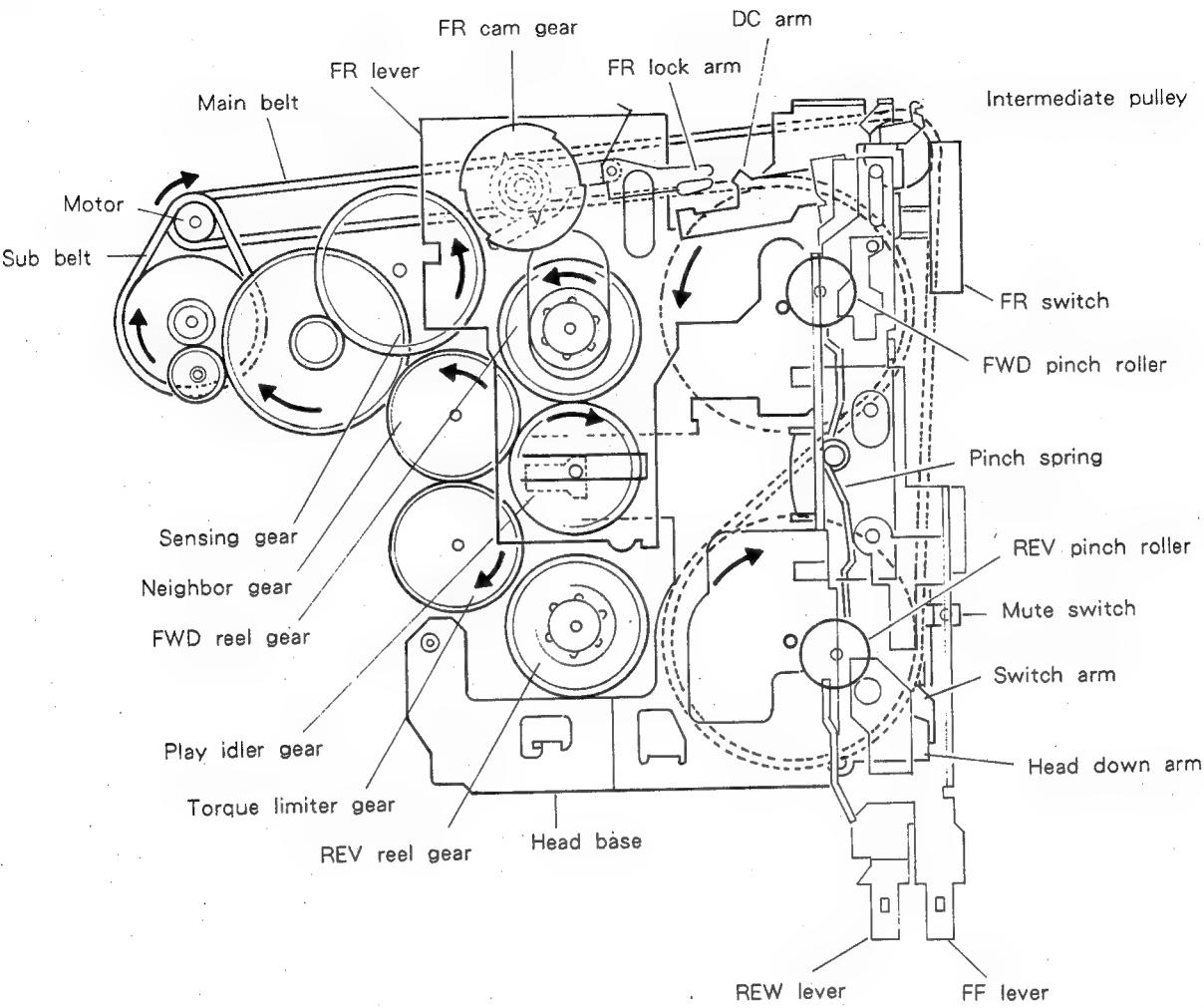


Fig. 11

When the FR lever is in the top position, the pinch spring is in the upper position to press the FWD pinch roller. The FR switch also moves upward and its reaction causes downward force on the FR lever. The spring attached to the FR lever applies upward force to the play idler gear from above to engage it with the neighbor gear and FWD reel gear.

The tape is driven in the FWD direction by a running motor and taken up by the REV reel gear via the torque limiter gear.

## (2) Direction change operation

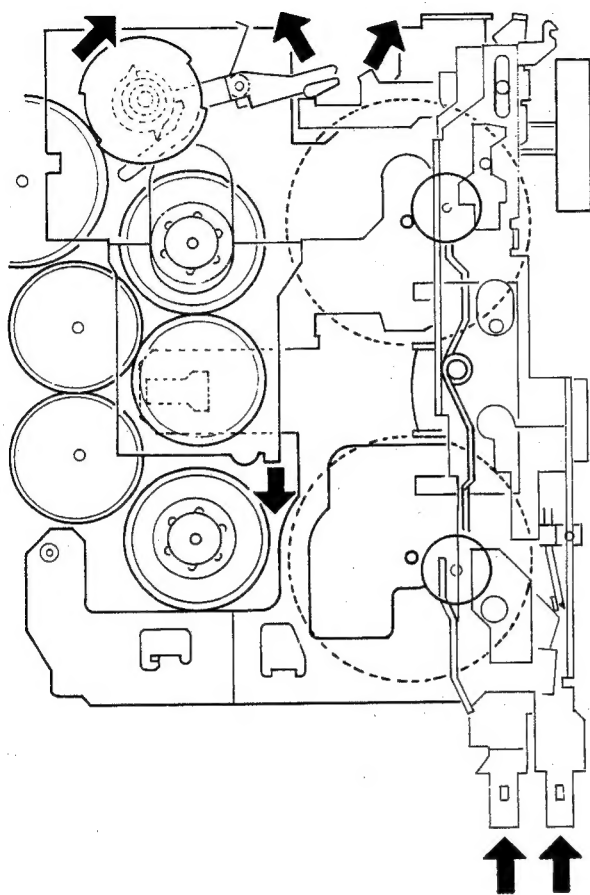


Fig. 12

The direction is changed by pressing FF and REW levers simultaneously. The DC arm turns along a cam groove of FF and REW levers to turn the FR lock arm. As the FR lever applies force from above downward, the FR cam gear turns and the notch meshes with the sensing gear.

As a result, the FR lever moves downward.

When FF and REW levers are kept pressed, the lock arm contacts the outside of the FR cam gear to prevent changeover between FWD and REV. Pressing FF and REW levers also cause the mute switch to be turned ON. In other words, muting is valid while FF and REW levers are pressed. (Fig.12)

## (3) REV play operation

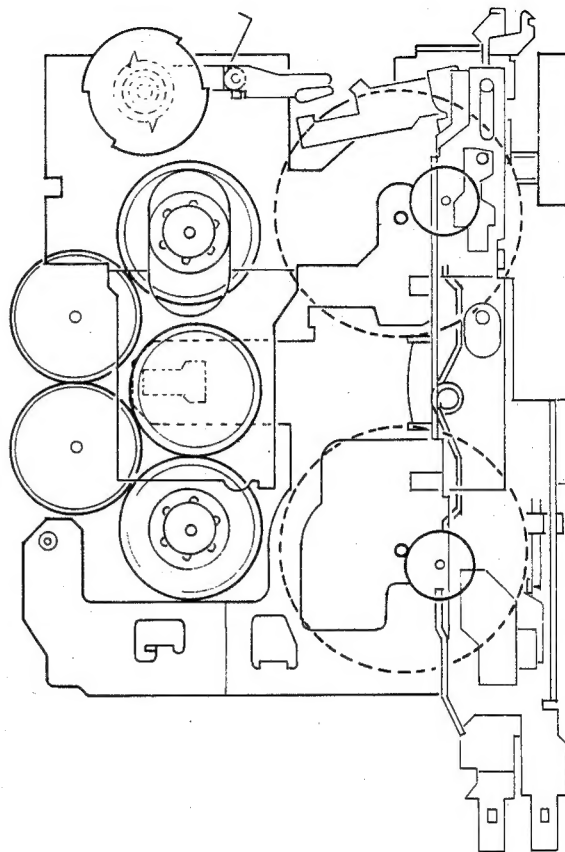


Fig. 13

Moving the NR lever up and down causes changeover among the pinch roller, FR switch, and play idler gear. With FF and REW levers having been returned, the FR lock arm returns to the normal lock position and locks the gear when the FR gear completes an one-half turn. The mute arm also returns to turn OFF the mute switch. The reverse play state is thus obtained. (The same applies to changeover from REV to FWD.)

## ● FF/REW Operation

### (1) FWD play operation

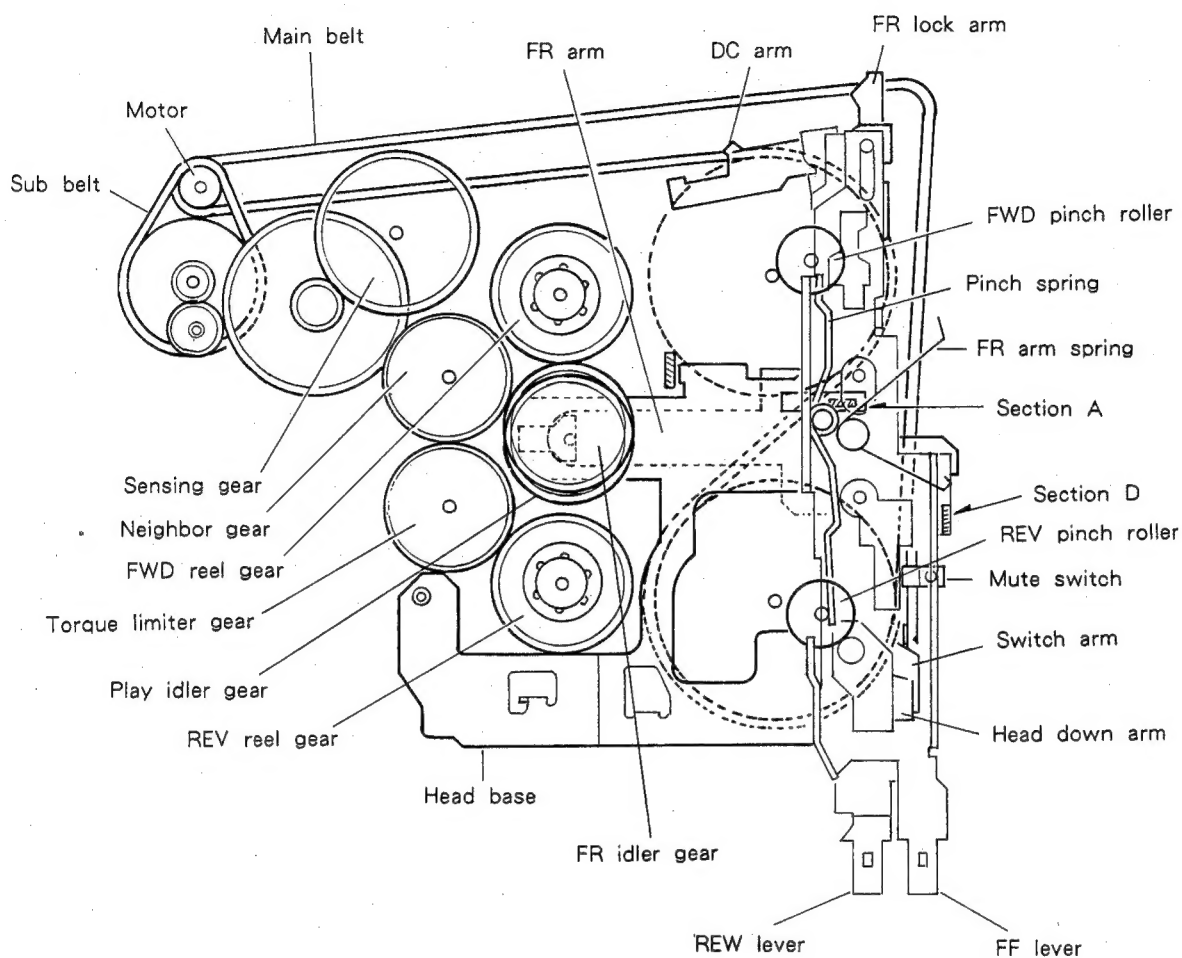


Fig. 14

In the FWD (REV) play state, the head base is fixed by a chassis stopper. The pinch spring presses the pinch roller into contact with a capstan to drive forward the tape. The REV reel gear takes up the tape via the torque limiter gear. In this case, the FR idler gear on the FR arm is centered by Section A of the head base and thus not rotating.

## (2) FF Operation

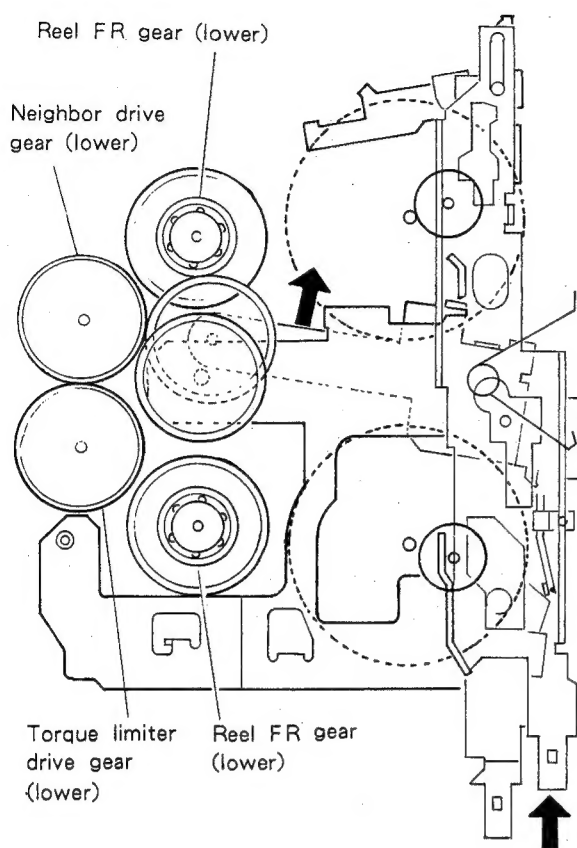


Fig. 15

FF operation is obtained by pressing and locking the FF lever. As the FF lever is pressed, the switch arm turns to turn ON the mute switch. The head base is moved backward along the FF lever cam groove.

As the head base moves backward to release the pinch roller from the capstan, the play idler gear is simultaneously disengaged from the reel gear. As the head base moves backward, the FR arm centered by Section A is put into rotation by the FR arm spring to engage with the FWD side FR gear.

The FF lever is locked by the FR lock arm and performs the FF operation. (Fig.15)

## (3) REW operation

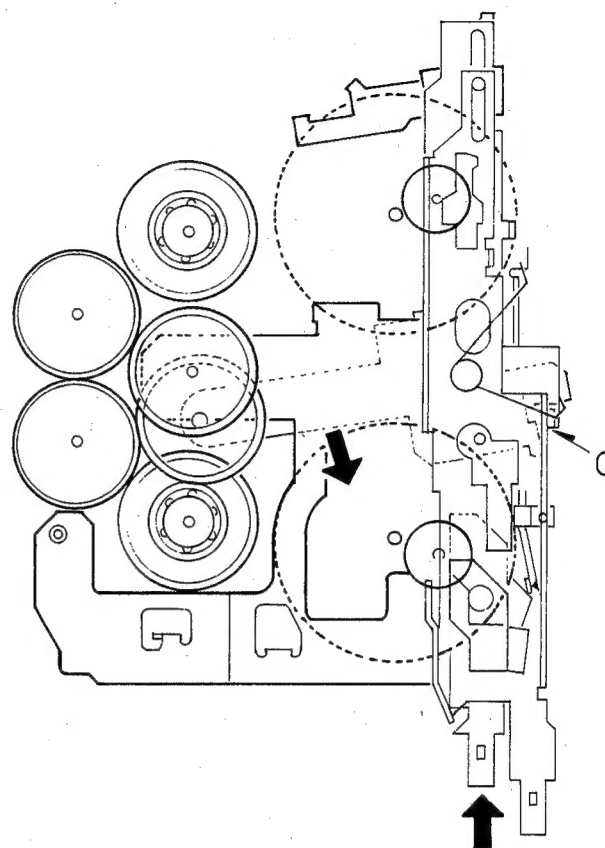


Fig. 16

Similar to the case of FF operation, pressing the REW lever causes the mute switch to be turned ON.

Simultaneously with release of the pinch roller from the capstan, the play idler gear is disengaged from the reel gear.

Section D of the REW lever presses a movable side of the FR arm spring, thereby engaging the FR gear to the FR gear on the REV side.

The REW lever is locked by the lock arm, performing the REW operation. This operation is cancelled when Section C is turned by the lever return spring. (Fig.16)

# ● Sensing Operation

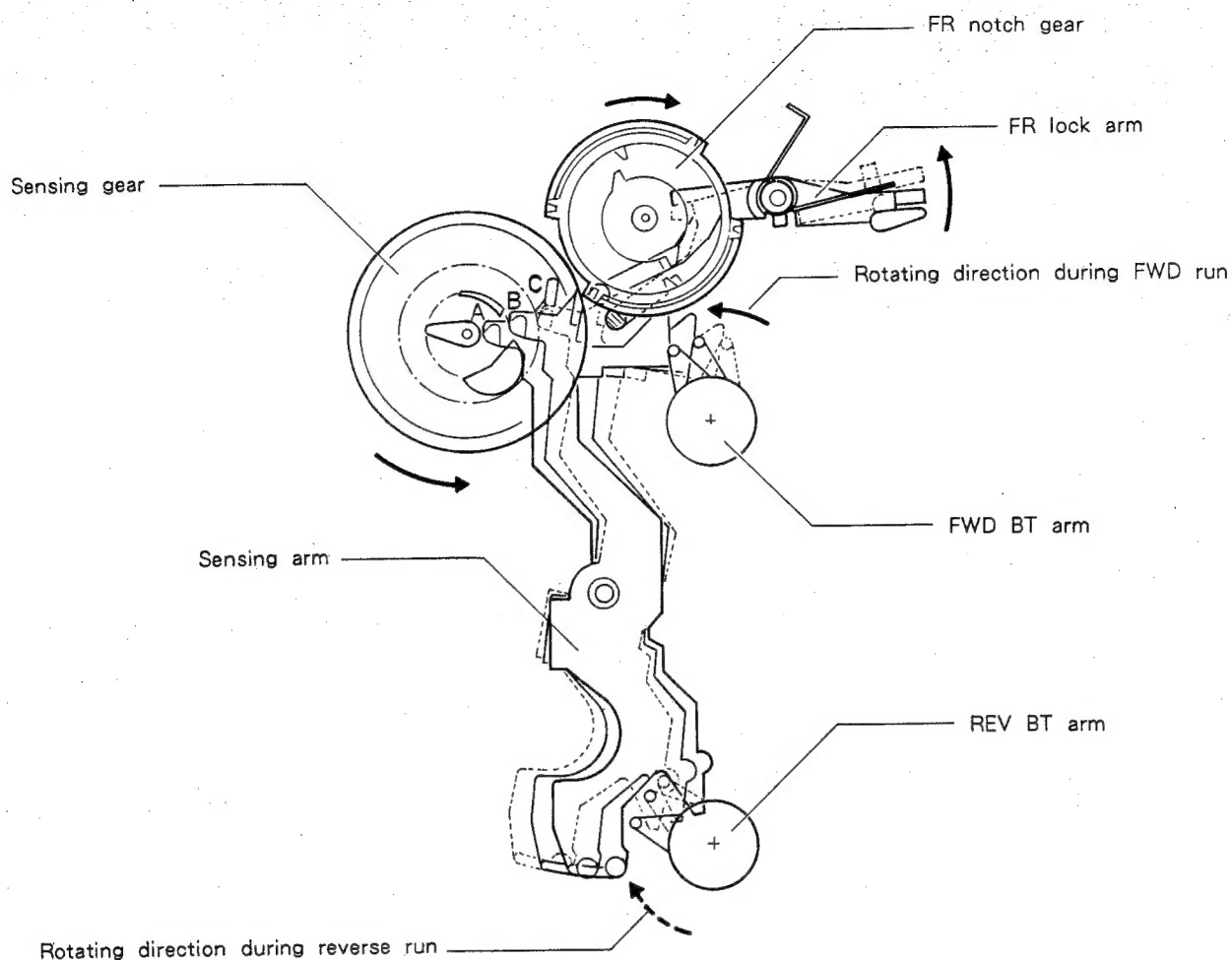


Fig. 17

1. During tape run: The sensing arm keeps oscillation between A and B under a force of the FWD BT arm (or REV BT arm).
2. At end of tape: The force of the BT arm is lost. The sensing arm stops at Position B, then pushed out to Position C by a crescent cam of the sensing gear.

## 3. Change of run direction:

The FR lock arm turns counter-clockwise along with movement of the sensing arm. The FR notch gear is unlocked and begins to turn.